DOCUMENT RESUME

ED 083 922 HE 004 790

TITLE	Study for Teaching Behavioral Sciences in Schools of Medicine, Volume III: Behavioral Science Perspectives in Medical Education.
INSTITUTION	American Sociological Association, Washington, D.C. Medical Sociology Council.
SPONS AGENCY	National Center for Health Services Research and Development (DHEW/PHS), Rockville, Md.
REPORT NO	HSM-110-69-211
PUB DATE	Jul 72
NOTE	467p.
EDRS PRICE	MF-$0.65 HC-$16.45
DESCRIPTORS	Anthropology; *Behavioral Sciences; Biology; Economics; Health Needs; *Higher Education; *Medical Education; *Medical Schools; Political Science; Psychology; Sociology; *Teaching Methods

ABSTRACT

Volume III of a study of teaching behavioral sciences in medical school presents perspectives on medical behavioral science from the viewpoints of the several behavioral disciplines (anthropology, psychology, sociology, political science, economics, behavioral biology and medical education). In addition, there is a discussion of translating behavioral science knowledge in health skills and organizing behavioral sciences within the medical school faculties. Related documents are HE 004 788 and HE 004 789. (Author)

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VOLUME III

BEHAVIORAL SCIENCE PERSPECTIVES
IN MEDICAL EDUCATION

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A Study for Teaching
Behavioral Sciences
In Schools of Medicine

National Center for Health Services
Research and Development
Contract No. HSM 110-69-211

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VOLUME III

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INTRODUCTION

What are the "behavioral sciences" and what is their relationship to the training of medical practitioners? These are the central questions examined in this part of the report.

We will not take time to offer history of the term or the events that led to use of the phrase "behavioral sciences" in preference to the older designation, "social sciences"; that has been detailed in Volume I. It should be clear from the outset, however, that the term should not be thought equivalent to the "behaviorism" of psychology, nor to the current "behavioral therapy" techniques. The term in its general usage refers to those academic disciplines that study the development and behavior of man as an individual organism and as a member of human society. In this connection it is therefore preferable to the phrase "social sciences" as the more inclusive term, since it points more accurately and comprehensively to the basic empirical process being studied--behavior, especially human behavior, its determinants, patterns, and functional implications for other observable features of interest--such as human biology and cellular disease. The common element among the various "behavioral sciences," is that at one point or another the scope of each scientific discipline touches behavior of the organism; empirically observable human behavior is the root datum for the various conceptualizations.

In this volume we do not include statements from all of the fields that have been included at one time or another among the "behavioral sciences." Boundaries are a bit vague, and sometimes the work of scholars from non-behavioral science fields (such as history) is included under the rubric because of the nature of the problems studied and the approach taken to them. We do, however, cover the principal fields designated behavioral sciences. A first group of papers includes those that are at the core of the term: anthropology (by Hughes and Kennedy), psychology (Wexler), and sociology (Bloom and Badgley). A second group of papers includes those from economics (Berry) and Political Science (Gore). Also included is a statement from behavioral biology (Kramer), a field which, in this context, provides a clear linkage between traditional medical concerns and the behavioral sciences.

The overall format for this section of the report is as follows: In Section A are two papers dealing with the intellectual and institutional context in which medical education occurs. Pattishall discusses the perceived current ferment and needs in medical educations, the shape of a changing present that betokens an unclear future. Stainbrook then takes up a discussion of the relationship of behavioral sciences to psychiatry--the medical specialty with strong historic involvement with the social sciences, and which has provided strong sponsorship for the introduction of behavioral science content in the medical curriculum.

Section B presents papers from the individual behavioral sciences. Authors discuss the nature of their particular disciplines and the relevance to those disciplines for the training of medical doctors. Obviously it is not easy in a few pages to characterize an entire discipline, much less its implications for the field of medical education. Beyond these common guidelines, it is clear that the authors in each case wished to stress particular aspects of the relationship between their discipline and the process of training student physicians.

Building upon the preceding section, in Section C, Weisenberg takes on the problem of how to translate or transform the data and skills of the behavioral sciences into instructional settings and modes that will be easily perceived as relevant by medical students at various stages in their educational careers.

Finally, in the concluding chapter, Pattishall turns his attention to one of the critical issues from an administrative as well as a teaching point of view: what is the best way to relate the behavioral scientists to the medical school setting? Is it through their being dispersed and administratively attached to several basic biological science or clinical departments, to serve in these contexts as continual advocates for the injection of appropriate empirical findings? Or is it better to take on the "protective coloration" under which other scientists work in the medical school setting and be organized into formal departments? Or some organizational format in between complete diffusion and departmental organization? Here is a personal statement by the chairman organizing one of the few such departments in the country.

Section A

THE CONTEXT

Curriculum Trends in Medical Education and Their Implications for Behavioral Science

Evan G. Pattishall, Jr., Ph.D., M.D.

Psychiatry, The Behavioral Sciences and Medicine

Edward J. Stainbrook, Ph.D., M.D.

CURRICULUM TRENDS IN MEDICAL EDUCATION

AND

THEIR IMPLICATIONS FOR BEHAVIORAL SCIENCE

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CURRICULUM TRENDS IN MEDICAL EDUCATION AND THEIR IMPLICATIONS FOR BEHAVIORAL SCIENCE

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It was sixty years ago when Abraham Flexner[1] studied the training of physicians in the United States. He made a series of recommendations which profoundly affected the evolution of medical education. These recommendations included the university affiliation, the academic model, the disciplinary laboratory, and the strong emphasis on the scientific base of medicine.

The Flexner study and recommendations have been so frequently quoted and acclaimed that its significance has begun to reach the stature of historical myth. As David Banta[2] recounts, the first university-type medical school had already been established by 1893 and a number of significant changes were already in progress several years before the Flexner study. For example, during the years 1908-10, prior to the Flexner Report, 28 medical schools closed their doors because of the already existing trends affecting medical education. The Flexner Report, however, did serve as a powerful force to insure that the medical schools would eventually become university affiliated, laboratory oriented and scientifically based institutions.

The science orientation continued to win favor during the 1920's and 30's, but the impact has been steadily growing during the past 30 years, with the ever increasing financial support for scientific research and with the discovery of powerful agents and techniques to conquer some of the traditional "killer diseases".

These forces have resulted in a dramatic mushrooming of the medical sciences. Medical education has so closely reflected this mushrooming that it has now clearly overshot the original criticisms and recommendations of Flexner. The pursuit of science has become so respected and powerful that it has essentially captured the goals and training programs of medical education. Many critics of medicine state that the medical student is forced to become first a scientist, or "scientist-like", and only secondly a professionally trained person with the knowledge, skills, and attitudes to solve a patient's problem and to treat both the patient and the problem.

Society is greatly indebted to science and to the scientist for the many break-throughs which have occurred during the past 30 years and the evidence is clear that quantitatively there has been a dramatic increase in the survival of human lives, but there is very little evidence of qualitative benefits achieved for these lives. We have concentrated so heavily on the science of molecules and the mechanisms of disease that human and behavioral factors have often been ignored.

This tremendous imbalance is currently being recognized by the public, medical educators, and students alike. The public has become so concerned that it is not getting either the quantity or the quality of medical care which it deserves. Thus, society is now beginning to demand that both the medical and the care aspects of medical care be provided for all the people. This is increasingly accompanied by the threat to withhold or alter many of the sanctions formerly reserved for the medical profession.[3]

Medical educators are also beginning to recognize and respond to the overloaded and lopsided medical curriculum, the disciplinary bureaucracies, and the fragmentation and overspecialization of teaching time and patient care. The student is concerned, because he sees himself being forced into an impossible learning situation often involving little relevance to the needs of a practicing physician. Also, he often sees himself being forced to participate in the perpetuation of priorities which seem to be incompatible with patient care and humanitarian concern.[4]

All of these factors, plus many others, are forcing a rapid evolution, or a quiet revolution, in medical education. Admittedly, many of the changes and movements in curriculum represent more of a "Brownian movement", in that there appears to be much activity, change, and reshuffling of schedules, hours, and some content, but often very little movement in the direction of more efficient and effective learning to accomplish the process of becoming a physician.

Nevertheless, there do appear to be some general trends in medical education, and some more specific trends in the basic sciences and the clinical sciences. These trends are important in that behavioral science must be aware of this evolution, or revolution, in order most appropriately and effectively to relate to the medical education scene.

There appear to be at least eleven identifiable trends in most medical schools today. These include:

1. The search for relevance.
2. Early introduction of clinical medicine and integration of the basic and clinical sciences,
3. An increase in curriculum flexibility with electives, free time,and multiple tracks,
4. The general adoption of the "core" curriculum concept,
5. An increase in enrollment,
6. A decrease in the total training time of the traditional four year curriculum,

7. An increased interest in research on the learning process and in the medical student as a learner,
8. An increase in self instruction and independent study,
9. A shift in attitude and preparation of the entering medical student,
10. An increased interest in the role of human behavior in the training of physicians, and
11. An increased emphasis on family medicine and primary care.

It is true that many of these trends overlap to a considerable degree, however I should like to discuss each briefly:

1. The Search for Relevance:

Irrelevance is being challenged for the sake of relevance and meaning. With much student and faculty help, as well as help from some national commissions and public agencies (3, 5, 6) as medical educators, we are being forced to recognize that the medical student is in medical school to become a physician and that he cannot continue to absorb the endless information explosion which has been superimposed upon the traditional courses of 10 or 20 years ago.

Nor can he achieve many of the fantasy notions that some basic scientists and academic physicians have structured for him. The simple reductionist model in the medical sciences has been accumulating an important, but often irrelevant, mountain of data in the name of education, professional standards, or understanding the scientific base of medical training and practice. Yet, we have little evidence to indicate that most of the mass of minutiae a medical student is forced to learn and regurgitate actually makes any difference in terms of improved patient care or physician performance. In fact, we have much reason to suspect that we have been fighting a losing battle, attempting to improve patient care by focusing on factual information rather than on problems of the patient and the patient care system.

2. Early Introduction of Clinical Sciences and Integration of Basic and Clinical Sciences.

The rigid separation of the basic science years from the clinical science years is being replaced by an early introduction to patients and patient care. This is having three effects: a.) It is adding a welcome note of realism to the activities of the medical student, reminding him of his original purpose for being in medical school, b.) The increase in clinical teaching time has resulted in a decrease in basic science teaching during the first two years. Indeed, some schools are actually proposing that some traditional courses be moved back into the undergraduate university program, or put on a remedial or prerequisite basis, and c.) It is providing an opportunity for the integration of clinical teaching into many of the traditional basic science disciplines. This is beginning to result in recognizable relevance in many of the basic science courses. While the clinical sciences are still being used primarily to accomplish the objective of learning the traditional basic sciences, a few schools are even beginning to teach the clinical sciences early for their own sake, not just to reinforce the basic science teaching.

On the other end of the continuum, the idea of integrating some of the basic sciences into the clinical years has not met with as much success. We do not appear to have many basic scientists who are able to bridge into clinical medicine, although there is some indication that this is a "new breed" of academician, and as the basic sciences are required to become more relevant, they will gain more experience in this type of bridging and integrating. If this trend is continued, the basic science department of the future will be more apt to reflect the model of bridging and integrating into clinical medicine, rather than teaching a separate discipline for its own sake. Indeed, someday we may come to the realization that the basic sciences exist primarily to support clinical medicine and that they can best be taught and learned in the context of clinical problem solving.

Another important aspect of this trend of earlier introduction of clinical teaching and more integration of the clinical and basic sciences, is the subtle, and sometimes not so subtle, shift of the power structure toward the clinical scientists. This is happening with increasing forcefulness on admissions committees, curriculum committees, promotion committees, etc., as well as at the assistant and associate dean levels of administration. The implications are that the long reign of the powerful basic sciences is slowly coming to an end. The clinical sciences will have the main say in the future as to who is admitted to medical school, what training they receive, and who survives the training. The traditional weeding-out during the first two years of students who have had difficulty mastering much of the basic science material is passing from the scene. Also, the learning of a basic science as an end in itself is becoming less and less justifiable.

3. Curriculum Flexibility and Electives.

The lock-step, highly fragmented, course offerings are being replaced with much more emphasis on flexible curricula so that there has been a dramatic increase in electives, free time, and multiple track alternatives. Many schools already provide one-fourth to one-third of curriculum as elective, so that it is quite common for the fourth year of medical school to be essentially elective, with additional elective opportunities having been offered during the first two years.(7, 8) The third year is still generally consumed by the usual required clinical clerkship rotations. In some schools the electives allow the student to go into much more depth, usually in a clinical area, and often provide a basis for specialization or multiple track opportunities.

The multiple track curricula exist more in theory and good intentions rather than in practice. However, as more flexibility and more student selection is introduced, there is a concomitant opportunity to specialize earlier or pursue individual interests and goals other than the usual lock-step sequence. Several schools (e.g. Stony Brook) are now designing such multiple track opportunities. It is proposed that this would allow the training of doctors in critically needed fields in a shorter period of time as well as provide additional experience in a specialty area early in the student's career so that he can make an earlier decision as to whether he wishes to continue to pursue the specialty.

Some of the most attractive aspects of the flexibility and multiple track trends are that students may be able to enter the curriculum ladder at multiple points, with multiple goals, and be allowed horizontal as well as vertical mobility. The successful passing of each hurdle or course may not be as important in the future as long as a student develops appropriate and measurable knowledge and skills to achieve a predetermined level of competence and performance in a particular track or specialty.

4. Adoption of the "Core" Curriculum.

There is much argument as to whether the idea of a "core" content has any validity, or even exists. It is argued, resisted, ridiculed, and acclaimed, yet about seventy percent of the medical schools confess to using the core curriculum concept. (7) The core has definitely taken over, and whether it survives may not be as important as the effect it has had on the over-all curriculum. It has attempted to require each discipline to reexamine its content in terms of basic components and relevance.

Considering that most basic science disciplines had continued to add on more and more new facts as a result of the information explosion, most medical school courses were becoming increasingly imbalanced and distorted with the overload. The new curricula required that the basic sciences teach "their thing" in two-thirds to one half the time. This tended to force a recognition that even though all of their teachings were basic, some things were more basic than others.

The most effective core presentations have resulted from the basic science disciplines that have attempted to resynthesize their content in terms of a relevant core. However, some common distortions of the core have resulted from attempts to teach only the first half of a traditional course, or to somehow talk twice as fast, still presenting the same amount of information. The half course, while it has tended to panic the student with feelings of less than enough preparation, it has also allowed him to learn the other half independently, and has often resulted in increased, not decreased, performance in the discipline. At least in some situations, "half a loaf" has been better than a whole loaf!

5. Increase in Enrollment.

In an attempt to secure more medical care and manpower, political, social, and community forces are now demanding that medical schools increase the number of physicians trained and that something be done to reduce the total time and cost involved in training a physician. (3 , 5, 9) Most schools have responded by increasing the size of their entering classes over the past few years. Between 1965 and the Fall of 1972, the 88 schools in existence in 1965 will have increased their class size by one third. This represents an absolute increase of 2,900 over the 11,700 students in 1965. An additional 1,300 first-year students will enter the 21 new schools that have been organized since 1965. (8)

The Carnegie Commission on Higher Education has set a goal of 15,000 first-year students by 1975 and the AAMC Committee on the Expansion of Medical Education has set the same goal for 1974. The new federal and state per capita financial inducements and the new health care legislation proposals are likely to make the achievement of this goal possible.

6. Decrease in Training Time of the Four Year Curriculum.

A decrease in the total training time for the M.D. has also resulted from the various pressures mentioned above. There has been some experimentation with five, six, and seven year programs during the past 20 years. (8) Only one school awards the M.D. after five years of post high school work, but four schools offer the M.D. after six years and five schools after seven years. Ten schools have a combined eight year program.

Most of these programs have taken the form of combining the four years of college and four years of medical school into one "integrated" program over five, six, seven, or eight years. The word integration has been placed in quotes, because the usual sequence has been one of time and schedule integration or reshuffling rather than curriculum content integration. At present there are a total of 26 schools with such combined college-medical school programs.

Another variation has been the so-called three year curriculum for medical schools, providing an option so that a student may choose to graduate after three years of study rather than the traditional four years. At least 26 schools have declared that they have such programs in operation at the present time. If one examines these programs, however, almost without exception they do not represent an actual shortening or redefinition of the curriculum, but a general compressing of the traditional four year curriculum into three years by appropriating the student's summer vacations, Christmas holidays, free time, between-term breaks, and by eliminating electives in the senior year.

In actuality, there is very little difference between the present three year programs and the compressed schedules intitiated during World War II. The University of Tennessee, for example, has had a three year program operating continuously since 1943.

It is still the goal of many medical educators, however, that some schools will actually redefine their content and program so that a true three year program can be offered that does more than rob the student of his free time and elective experiences.

7. Interest in the Learning Process and in the Medical Student as a Learner.

During the last ten years there has been a dramatic increase in the interest and attention directed toward the learning process and in the measurement of the product and process of medical education. The technology of educational research and measurement has developed to the degree that most medical schools are utilizing such talents and resources to an ever increasing extent. (10, 11)

Some of the first schools to establish a separate division or office of research in medical education were Case Western Reserve, Buffalo, Illinois, Southern California, Georgia and Michigan State. At present there are more than 33 such educational research units in medical schools and they employ more than 600 faculty.

As more medical schools alter their curricula to the extent that new instructional and evaluation materials are required to implement the new curricula ideas, there will be a continued increase in the formation and the utilization of educational research resources. A few of the innovations which have either originated with or are dependent upon such educational resources are self-instructional materials, programmed instruction, simulated patient exercises, computer instruction and examination, development of educational objectives, and curricula evaluation.

8. Self Instruction and Independent Study.

The increase in self-instructional opportunities and independent study may be one of the most subtle but powerful developments in the medical curriculum.

The increased numbers of students admitted to medical school, the attempt to shorten the traditional four year curriculum, the development of multiple tracks with different points of entry and earlier selection of specialty interests, the proliferation of seminar and independent electives during the entire three or four years, the renewed interest in the learning process and in medical education research, and the developing programs in self-assessment and recertification are just a few of the trends which are going to make self-instructional opportunities and independent study programs flourish over the next ten or more years. We can expect that more and more of the traditional and integrated courses will be converted to self-instructional units.

The lecture will not become extinct, but it may become fairly rare, except in cases of special faculty competence in lecturing and for the purpose of demonstrating integrative thinking, or to satisfy a few persistent and colorful personalities among the faculty. Everyone appears to recognize that the lecture is one of the poorest methods of conveying information, yet it has persisted. At least one of the beneficial effects of such a trend is that the remaining lectures should have a much higher degree of excellence and relevance than the typical lecture found in most medical schools today.

Several schools have been pioneering in the development of self-instruction materials and units; notably, Ohio State University, University of Washington, the University of Pittsburgh, and the University of Rochester. More recently the University of North Carolina, Pennsylvania State University, Michigan State University, and the Medical College of Georgia have begun to develop such materials and programs. In fact, there is now a Southern States Consortium of 29 medical schools committed to developing and sharing such materials.

The University of Pittsburgh has put most of the didactic portion of obstetrics on a self-instruction basis with tapes, film, video, slides, etc. and this has been adopted by more than a dozen schools. Other examples include the pharmacology course at the University of North Carolina and the physiology course at Hershey. Ohio State has attempted to use the computer and other individualized instruction techniques to program the entire basic science curriculum and the didactic part of the clinical curriculum.

Self instruction programs to date have emphasized the need for some mechanism to allow for faculty dialogue and guidance and small group discussions. After the initial time investment required to develop each unit, the time involvement of faculty is usually reduced somewhat. It does not reduce the need for faculty, but the flexibility allows more students to progress through the learning experiences. As faculty and students begin to experience and appreciate the potential of students (and faculty) progressing at their own rates, according to individual interests and skills, with the teacher regaining the tasks he performs best (e.g. dialogue, integrating, inspiring, and guiding development), more and more medical schools will institute self learning programs coordinated by tutors and supplemented by small group discussions.

A projection into the future might even include such a radical idea as "open admissions" whereby all students who aspire to become physicians or health care professionals could each have an equal chance on the basis of their ability, motivation, and performance in medical problem solving and patient care skills.

9. Shift in Attitude and Preparation of Students.

There is considerable evidence that the student entering medical school today differs from the student of five or ten years ago. Funkenstein (12), Matarazzo (13), Dube (14), and others have shown that the grade-point averages, the Medical College Admissions Test scores, and the IQ scores have tended to increase over the past few years. They assert that the student entering medical school today is better prepared than his colleague of five or ten years ago, partly because the increased competition has had the effect of raising the GPA and the MCAT score of students who are finally accepted to medical school, but also because the high school and college curriculum has treat the entering medical student as though he had only had the traditional premedical courses, whereas he may have completed his basic college chemistry, biology, or physics while he was in high school, and has now progressed in college far beyond the student of a decade ago.

The medical curriculum is slowly beginning to recognize this advanced preparation. Also, the appropriateness of some of the basic science courses is being challenged (e.g., biochemistry, cell biology, genetics), since an increasing number of students are entering medical school having already completed respectable courses in many of the basic science subjects. Rather than repeat the same introductory courses, many medical schools are either allowing students to test-out in introductory courses or are revising the medical school course so that it is more appropriately problem solving oriented and provides a medical perspective.

Another well-publicized change had occurred in the attitudes and goals of entering medical students. (15,16,17) Much of the social concern, the humanitarian commitment, and the activist strategy of the contemporary college student is now being reflected within the medical student population today. They are very much concerned with relevance to the practice of medicine, the importance of patient care, and the need for social and environmental changes. They are increasingly being heard as participants on curriculum committees, program planning committees, evaluation committees, community concern groups, etc. In a few instances their participation has been challenged as being ineffective and based on ignorance and arrogance. However, most often it has been acclaimed as unusually constructive and helpful in terms of articulating the meaningful, or meaningless, learning experiences in the medical curriculum and the use and abuse of patient care in the educational process of the physician.

Most medical schools now include students on major standing committees, and their participation is regarded as generally helpful. Certainly, the new breed of student provides us with an opportunity to gain instant feedback on the meaningfulness of the learning experiences we attempt to provide and can be helpful in planning future learning experiences.

10. Interest in the Role of Human Behavior in Training Physicians.

There has been an increased interest in and commitment to the teaching of social factors and human behavior as a necessary part of the training of the physician. Part of this increase can be attributed to the social or "soft science" vacuum created by the mushrooming of the "hard sciences" in the last twenty five years. The "social deficit" in solving medical problems and in patient care practices has become so evident that even the patient has begun to realize that he is not the recipient of all that modern science could or should provide.

This concern has also been promoted by many medical faculty with a strong sense of social conscience and patient care orientation — long before the student rebellion for relevance and social concern became a strong factor in the medical school subculture. (18, 19)

The increase in social and behavioral scientists in the medical schools and the increase in the teaching time for which they were responsible reflects this trend. Thomas Webster's (20) comprehensive review of behavioral science teaching demonstrated a rapid and steady growth, so that by 1966 the preclinical teaching had increased to an average of 96 hours per school, augmented by required interdepartmental teaching exercises, and involving both preclinical and clinical interdepartmental teaching. The recent establishment of a behavioral science section of the Part I examination of the National Board is further evidence of the concern of medical educators for the social and behavioral factors in medicine.

If one takes into account the recent, but rapid increase in elective time throughout all four years of medical school, the increase in behavioral science teaching time has been even more dramatic as our new breed of action-oriented and person-concerned medical student has tended to favor the electives in behavioral science.

As mentioned above, the new medical student reflects a real search for relevance, a new sensitivity to the social, moral, political, and human rights aspects of medical problems and patient care. He is also expressing an increased insistence on playing an activist role in guiding his own future and in changing many of the incongruencies of his society and the medical profession. This concern has added the increased demand that the social and humanitarian factors be considered as of special, if not equal, importance.

With the activist student, the aroused and sometimes angry patient, the concerned faculty member, and the failure of science to produce the promised panacea, there has been renewed hope placed on the social and behavioral sciences.

This poses a rather interesting paradox. Students, faculty, and patients are recognizing the importance of more training and concern with the social and behavioral factors. At the same time, the basic science faculty is being threatened with loss of its own teaching time and is apt not to respond too sympathetically to another basic science group competing for their curriculum time. The students, while they may recognize the need for more social and behavioral skills, are quite aware that the behavioral sciences have not been a part of the traditional basic science survival system. As in most any behavioral system, the survival instinct most often wins over social, ethical, or moral values.

Thus, students (and faculty) appear to be trapped in the system, making a desperate claim for curriculum change, but fearful of being unable to survive the additional science learning load necessary to institute the behavioral sciences. Until there is a complete re-examination of the relevance and appropriateness of all of the basic science content, or a restructuring of the survival system, the paradox will continue.

11. Emphasis on Family Medicine and Primary Care.

The need for more family physicians and primary care physicians has been documented by almost every study commission that has concerned itself with the quantity and quality of medical care delivery. (3, 5, 21) Many medical educators have begun to respond to this felt and expressed need by pioneering the development of family medicine or primary care departments or programs. (22, 23, 24) This has actually progressed to the point that there are now more than 35 established teaching departments of family medicine or primary care in medical schools and at least an equal number in the planning stage of development. (25)

It is quite understandable that medical students have not chosen family medicine when one considers the development of specialization over the past twenty years. Instead of being trained in primary medical care, or how to be first a primary physician, the medical student receives most of his training in secondary or tertiary care.

From the beginning , he is selected by highly specialized basic scientists and clinical specialists. Then he is mainly exposed to secondary or tertiary care physicisns as teacher-models during his four years in medical school. Thus, he is rarely able to see, much less have a chance to work with, a primary physician who has the responsibility for comprehensive and continuing medical care. If he sees his specialist-teachers struggling with various diagnostic and treatment problems which they cannot answer, how could he imagine himself able to learn enough as a primary or family physician to make a dent in all the medical problems he might face in actual practice? Having been selected, taught, guided, inspired, and recommended by the specialist, there should be little wonder why he also chooses a specialty rather than primary or family care.

There is little doubt but that the public will continue to add increased support and demand for more and better primary care as evidenced by the Comprehensive Health Manpower Training Act of 1971. Also, there is little doubt but that this trend will have a powerful impact on medical education and the training of future physicians.

ADDITIONAL TRENDS AND PROBLEMS

Many of the above trends will continue to exert an influence on medical school curricula, but there are also several problems and trends which are due for more emphasis in the future. A few of these are briefly described below.

Consider the fact that the student spends as much time and energy studying the esoteric and rare diseases which he may never see, rather than studying and mastering the most common diseases which he will see almost every day of his practicing career. This may be a natural result of the specialization found in a university medical center where many patients are sent because of the faculty's special competency or research interest in rare or difficult problems. However, it does influence the clinical curriculum of the medical student.

Also, consider that the examination system in the clinical sciences (and the basic sciences) is based on the rationale that most of the students know the common disorders and that the only way you can select or reward the best student is to test him on the rare or esoteric, thus providing the faculty with a ranking of competence among students from the most to the least competent. This is a myth, because students then study and aim for the esoteric or the minutiae rather than mastering the most common problems. At best he ends up well trained in perhaps 70 per cent of the common problems and 70 per cent of the esoteric problems, rather than 100 per cent of the common problems and perhaps 50 per cent of the esoteric ones which he may never see.

Another concern is that the medical student receives almost his entire training in a hospital setting with patients who are acutely ill, whereas in real-life, he will be spending most of his time, energy, and expertise treating patients who are ambulatory, rather than bedridden, and who are chronically ill, rather than acutely ill. This does not imply that he should not have mastered a certain level of training for hospitalized patients who are acutely ill, but it should not mean that it receive 90% of his curriculum time.

A final discouraging note is the observation that most of the examining and changing of curriculum today involves the rearrangement of the basic sciences with some clinical science involvement, while most of the clinical clerkships are essentially unexamined and unchanged.

On the encouraging side, there are several movements in the direction of rectifying some of the gross inadequacies in the clinical curriculum. Among these are the formation of self-instruction programs, of departments of family medicine or primary care, the increase in ambulatory training, the trend to use more community hospitals and community physicians in the teaching programs, the increased involvement with community medicine, and the problem solving or problem oriented approach to learning clinical medicine.

It must be recognized that medical education decisions are still being made by clinical specialists who have considerable vested interest in the present training programs. Also, with the new money and emphasis in primary care, many of the clinical specialists are taking the position that they are, and have been, practicing primary care, and that they will give more emphasis to primary care in the training of their own specialists. This could have a very positive effect if it is approached with the goal of improving the primary care training of the physician and the primary care of the population.

THE IMPLICATIONS FOR BEHAVIORAL SCIENCE

Having identified eleven trends which are actively influencing medical school curricula today, it is important to consider each trend in terms of its implications for the teaching of the behavioral sciences in medical schools.

1. Irrelevance Challenged for the Sake of Relevance and Meaning.

It would seem obvious that a behavioral scientist does not want to design his teaching as being irrelevant to the training of a physician. Nevertheless, this is often what happens when one selects content primarily from the point of view of a particular behavioral science discipline or the perspective of the behavioral scientist, rather than the needs of the medical student or the content that is required for the solving of medical problems.

Since most behavioral science courses are of more recent origin, it behooves us not to follow the historical evolution of the basic sciences by attempting to develop our content as though we were teaching a pure discipline. The information explosion has occurred in the behavioral sciences, as it has in the other sciences, but we must constantly demand that our faculty extract the behavioral science content from all the behavioral sciences and translate the content in terms of relevance to medical problems. This does not exclude the possibility of presenting theoretical or philosophical concepts, but it does demand that one understand and be able to demonstrate the tie-in or significance of the less relevant material. The student should be able to see the learning of the material as bringing him one step closer to his ultimate goal of becoming a physician. We will gain little by playing the old academic game of cramming more and more facts into a course because it is of interest to the discipline itself or the particular behavioral scientist, projects a scholarly image, or maintains academic standards.

From the standpoint of survival as a basic science, the behavioral sciences can achieve a significant advantage over the other basic sciences by organizing the behavioral science teaching on as relevant and meaningful a basis as possible. This means that behavioral science content must be based on human behavior. As relevance becomes determined more and more by clinical faculty rather than basic science faculty alone, it seems reasonable to predict that those basic sciences which survive will have a high relevance and meaningfulness component. Those parts of the basic sciences which are more purely discipline oriented will probably be moved back into the university undergraduate years or be eliminated entirely as irrelevant.

2. Early introduction of clinical teaching resulting in more relevance to the task of becoming a physician, an increase in clinical teaching time, a decrease in basic science teaching time, and an increased integration of the clinical and basic science disciplines.

With the concept of the behavioral sciences being basic to all fields of medicine, we must put considerable effort into developing supportive and bridging relationships with all clinical departments. This does not mean that behavioral scientists have to begin playing the clinician role. Indeed, we will be interpreted as a threat if we do so, but we must seek relationships with clinical faculty on both a teaching and research basis. This will be of particular educational advantage to the behavioral scientists, as it will teach them about the types of clinical problem solving for which they are preparing the medical student. Thus, they will acquire the perspective of clinical medicine so that they can critique their own basic teaching in the behavioral sciences in terms of clinical relevance. Also, it will open many opportunities for the behavioral science content to be integrated into clinical teaching.

One must remember that the content of all basic sciences is not retained in its basic disciplinary form by the practicing physician, but is integrated and retained in the context of specific clinical problems of diagnosis, patient care, and mechanisms of disease. Therefore, the sooner we learn to integrate with those clinical problems, the more crucial we will become for the training of the physician. This is valid for all basic sciences.

An additional point should be made for learning to think of behavioral science as an integrative discipline. Consider, for example, that the expression of human behavior occurs at the interface between the internal (physiological) environment and the external (social, cultural) environment of the patient. Thus, behavior becomes the logical end result of any disruption of homeostasis in either the internal or external environment.

Thus, behavior is the major mechanism available to the patient in order to reestablish internal or external homeostasis. Since some change of behavior is most often involved in biological and social dysfunction, the teaching of behavioral science can be an effective integrative medium to pull together the various biological and social components of illness and health.

3. Flexible curriculum with increase in electives and free time.

The behavioral sciences are especially well suited for electives. Most required behavioral science courses cover such a broad area of content that it is difficult for faculty or students to achieve much in-depth instruction in any one area of behavior. Electives allow the student to select those additional areas in which he is most interested, and hence he will have the opportunity to learn the most. It also allows the faculty to offer an entire unit with a reasonable degree of continuity and academic respectability.

The common practice of allowing the fourth year of medical school to be essentially elective was initially seen as providing the student with an opportunity to return to the basic sciences and/or to take special training in clinical areas in which he was either deficient or felt the need for more advanced training. With the nearness of graduation and the impending responsibility for disease diagnosis and patient care, most medical students have expressed little or no interest in the basic sciences during their fourth year. If the behavioral scientist can develop his teaching in the context of more relevance and integration with the clinical sciences, he will be better prepared to offer the fourth year medical student an elective experience that relates more closely to his professional and career goals. The ideal would be to combine the student's clinical interests and goals with the study of the basic science of human behavior in a medical problem solving situation.

4. The general adoption of the "core" curriculum concept.

If a sincere attempt has been made to compile the core in terms of a resynthesis of components of a discipline that are relevant and necessary in solving a medical or patient problem, the core concept can do much to strengthen the basic science curriculum.

There are many behavioral scientists who resist the core concept, however, because they feel that the behavioral sciences are too broad or there is no identifiable core. This is probably true if one is attempting to formulate a unified multidisciplinary behavioral science. However, if one considers the large mosaic of the behavioral sciences, one has to recognize that there are at least some basic facts and concepts; and that some of these basic facts and concepts are more important or central than some others. Considering the type of medical problem to be solved by the physician, some behavioral science knowledge becomes clearly more important or relevant than some other behavioral science knowledge.

In establishing a core for the behavioral science curriculum, it is important to recognize several dimensions of the problem. It is not sufficient merely to secure the most competent psychologists, sociologists, anthropologists, etc., and ask each to summarize the basic components of his discipline in as concrete and concise a form as possible. This may produce the bare essentials for understanding the individual disciplines of psychology, sociology, anthropology, etc., but it may not be organized in a useful form, nor contain the most important information necessary for a student to understand a medical problem. In fact, it is very likely that a basic understanding of these disciplines will soon be a premedical requirement for admission to medical school.

Likewise, the core can not be obtained by somehow locking all of the behavioral scientists in one room for several days, or even weeks, and expecting them to agree on the validity and importance of various units within each separate discipline. This procedure can accomplish a lot, however, in terms of training the various behavioral scientists to think and work together on a practical level.

Even though the above methods are the most frequently used in behavioral science teaching programs, it is even more valuable to apply a multidiscipline approach by incorporating the active participation of one or more clinical faculty. This is one of the few places where a faculty member trained both as a behavioral scientist and as a physician can have an immediate payoff. The clinical input and clinical bridging can also be accomplished, however, by working closely with a faculty member in a clinical discipline, such as, family medicine, internal medicine, or pediatrics. The behavioral scientist must be able to become familiar with the clinical problems to be solved by the student physician. Likewise, the clinical faculty member must be able to explore the various areas and topics within the behavioral sciences which might relate to or throw some light on these medical problems or patient care situations.

Once one has established the behavioral components which are relevant to the practice of medicine, the task then becomes one of organizing the content into some meaningful form. It should be remembered that, in the long run, most basic science knowledge will be retained primarily in the manner in which it is used, rather than in the

University of Washington, the University[13] of Pittsburgh, and the Uni-

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manner in which it is initially learned. Behavioral scientists must keep this constantly in mind as they develop and design learning units with both academic substance and professional relevance. There may appear to be no end to the underlying knowledge and theory which might seem appropriate to the purely discipline-oriented behavioral scientist. However, if one retains the emphasis on the bridging and the problem solving needs, much theory can be put in perspective or assigned to an elective sequence.

As stated earlier, the need is to design the behavioral science content so that it has its input at the most appropriate point and level during the entire medical school curriculum.

After one knows the kinds of medical problems the student physician will be solving, the kinds of changes in behavior one is attempting to accomplish, and the most appropriate point to introduce it, it is then important to list the specific behavioral objectives for each segment or teaching unit in the behavioral science curriculum. This is a step that is usually omitted by most teaching disciplines because it really involves making explicit what you are trying to accomplish before you try to accomplish it. It is on this pragmatic level that we come to the realization that we are attempting to do more than to unravel or logically portray the various components of a behavioral discipline. It will also help us differentiate the many gray areas between clinical psychiatry and the basic components of human behavior which relate to all areas of clinical medicine.

In the selecting of core content for a particular behavioral science unit, it is especially important to examine the material in terms of the supporting data and the firmness with which we can make our statements or generalizations about the range of normal and abnormal human behavior. While this may seem like an unnecessary emphasis, the two most frequent complaints lodged against some teachers of human behavior is that what they have to teach is either common sense or is based on "soft data." The objective here is to select the knowledge and data about which we can be both certain and relevant.

Some day, we may be able to design a curriculum that will not require a complete relearning of a basic science in order for it to be used. The basic science discipline that is able to accomplish that goal should have no fear of being eliminated in curriculum revisions of the future.

5. Increase in enrollment.

The increase in enrollment which has been demanded by many political, social, and community forces will have a major impact on the behavioral sciences through increased manpower needs. At present, there is a shortage of trained medical behavioral scientists to teach the required behavioral science courses in medical schools at the existing level of enrollment. If one considers the standing needs of the new and developing medical schools and adds to that the expected increased in class size of all medical schools, it becomes apparent that the same manpower pool of behavioral scientists will be required to teach an even heavier load then exists today.

Teaching behavioral science in a medical school involves far more than academic competence as a social scientist in a university department transplanted into a medical setting, or than a professionally trained psychiatrist. It is important for medical schools with active multidisciplinary behavioral science teaching programs to initiate training programs to produce the necessary medical behavioral scientists for the next five to ten years of increasing enrollment. If we fail to do this, many schools will be forced to develop and teach behavioral science using social scientists who have not acquired an understanding of the needs of medical students and medical practice, or by using psychiatrists who have not necessarily had behavioral science training.

The increase in enrollment and resultant increase in manpower needs makes it imperative that behavioral scientists immediately begin to develop self-instruction units. This will not reduce the teaching load as faculty-student dialogue is still important, but it will allow several behavioral science programs to share content development which is very time consuming.

6. Decrease in the total training time of the traditional curriculum. Several implications are relevant for the behavioral sciences. If the curriculum of a particular school is moving in the direction of attempting to combine parts or all of college and medical school, the behavioral sciences can play a unique role as an integrating science throughout the college and medical school training. This is apt to be especially true when attempts are made to introduce clinical medicine early in the curriculum, as social and psychological factors can often be observed more easily than some underlying physiological or biological mechanism. An attempt can also be made to make the behavioral science courses in college more relevant to the eventual goal of practicing medicine.

One of the major difficulties is that the behavioral sciences are often taught by the Departments of Psychology, Sociology, and Anthropology. Unless there is planned integration and correlation, this can result in a purely disciplinary approach to the teaching of behavioral science with the loss of relevance and meaningfulness as far as the developing physician is concerned.

The compressing of four traditional years of medical school into three years by using all vacation, free time, and electives, is the common approach to shortening the training time for physicians. The behavioral scientists will not suffer any more than any other faculty with an accelerated teaching and work load, except they will become overloaded more quickly due to the more rapid growth of the behavioral sciences and the short supply of trained faculty. The main person to suffer will be the student without time to relax, consolidate, or explore areas of intellectual and professional curiosity.

If the pressure on the medical student increases too greatly, the behavioral sciences can suffer by becoming the target of the student's anxiety or agitated depression, whereby the student attempts to lighten the pressure and overload by attacking the discipline or disciplines that appear to have less survival value in terms of his immediate goal of not flunking out of medical school. We can expect that this will be directed toward the newer disciplines, such as behavioral sciences, humanities, family medicine, etc.

It is also possible that if medical school faculties are pressured to shorten the training time for the M.D. without reexamining the content of all courses, the behavioral sciences and more recent disciplines will be in greater jeopardy of losing curriculum time in the reshuffling of the medical school courses.

7. Increased interest in research on the learning process and in the medical student as a learner.

This trend provides some comfort and safety for the behavioral scientist, partly because much of the work is being done by other behavioral scientists through Departments, or Divisions, of Research in Medical Education. As new evaluation criteria and measures are developed and applied to existing curricula, medical educators are beginning to reexamine many of the more traditional and heretofore unchallenged educational methods in the training of a physician.

Behavioral science teaching units should most certainly take advantage of some of the innovations being developed by their fellow behavioral scientists in order to improve their own instruction in the behavioral sciences. This new interest in the learning process can help us lead the way among medical school faculties, so that our teaching will be especially meaningful, relevant, effective, and efficient. It's difficult for anyone to criticize, or eliminate, a teaching program that rates high on relevance and meaningfulness.

8. Increase in self-instructional opportunities and independent study.

The self-instructional unit, independent study, multiple tracks, and electives will have much influence on behavioral science teaching, as it will on most basic science and clinical disciplines in medical schools. As has been expressed above, disciplines with less identifiable content will be forced to work much harder at the task of identifying and organizing (and possibly defending) such content. Since this is probably the highest priority need for teaching programs in the behavioral sciences, this trend will have a very beneficial effect on our developing teaching programs.

We should not assume that just because most of the other basic sciences have already identified their content, that they will be able to design self-instruction packages any better than behavioral scientists. Some may have an even more difficult time with the task, since they have an overabundance of content which will have to be reorganized.

At Hershey, we are actively converting parts of our behavioral science teaching program into self-instruction units and will continue to develop new units and materials. Our experience thus far has been successful and rewarding.

If behavioral scientists can begin thinking in these terms and designing new content on as much of a self-instructional basis as possible, we will be much farther ahead of other teaching disciplines. We should be able to use it as an opportunity to help us define our content and improve our teaching to the point of freeing our faculty for what they do best: interacting in a real dialogue with students.

9. A shift in attitude and preparation of the entering medical student.

This shift, discussed in the trends above, has several implications for the teaching of behavioral science. With the competition for entrance into medical school becoming even more tough than it has been in the past, the characteristics of the medical student may change in the direction of those seeking the highest grades and those with exceptional ability to score high on paper and pencil tests, such as the MCAT. In order to impress medical school admissions committees, students may try to outdo each other by taking as many science courses as they can, at the exclusion of much of the social sciences and humanities. The fear of many medical educators is that this could produce an extremely bright, but rather narrowly-educated person who may be refractory to social, behavioral, or humanitarian concerns. The practice of medicine is still more pragmatic and humanitarian than intellectual or abstract.

On the other hand, with the present increase in the new activist generation of students, impatient with the abuses of society and determined to encourage confrontation with educators, politicians, and industrialists, we may find that more of the entering medical students are unusually receptive to the social and behavioral sciences. If we demonstrate a concern for the relevance of the behavioral sciences to the practice of medicine, to patient care, and to social and environmental changes, we can most surely capture the interest of this new kind of medical student.

One pitfall should be mentioned. Many students (and sometimes faculty) are apt to see the behavioral sciences as providing the needed tools and techniques for social and political change. While we may be able to offer more help and know-how than other medical school disciplines, this can also become a trap and can severely distort the content of the courses by making them exclusively action-oriented. Such a field experience can serve as a valuable laboratory exercise, but it must be carefully planned to include substantive content and attitudes. We must not lose sight of the goal of understanding the social and behavioral factors which interact in disease, patient care, and health. Our primary task is still to train the best possible physician, but we can also assist him to develop his skill as a social change agent.

10. An increased interest in the role of human behavior in the training of physicians.

With the increased interest and receptiveness of curriculum committees, the behavioral scientist is apt to find himself with available teaching time, but without available teaching faculty or organized content to present to the student. The need for trained medical behavioral science teachers has already been mentioned above, however, what these teachers do is also important. As in Parkinson's law, there is a tendency to fill whatever time is made available. This can be a great hazard for a new discipline or a new teaching group unless the focus is on well organized and relevant content.

The increased interest in human behavior is not limited to the behavioral sciences, but also includes the disciplines of psychiatry, pediatrics, psychosomatic medicine, etc. An important task of the behavioral scientist is to differentiate those aspects of human behavior which are basic to all areas of clinical medicine versus those areas basic primarily to clinical psychiatry. Psychiatry and behavioral science must use every opportunity to work and teach closely together, however, behavioral science must be willing and able to assume the major responsibility for teaching the basic science of human behavior at all levels of the medical curriculum.

Since most medical students are starved for some contact with patients, the clinical presentation can be used as an effective teaching mechanism. Much social science content can be learned best in the context of a patient and his problem if we are careful to make explicit the behavioral science objectives of each patient demonstration. One warning: the behavioral sciences are often awed by the opportunities for relevance through patient contact without giving equal concern for content. We must do both. If we can learn this lesson, we will be far ahead of the other basic sciences.

The behavioral sciences and clinical psychiatry are the most logical allies for students and faculty interested in psychosocial factors and illness. However, neither of us can afford to be the only department or academic group assigned that responsibility. It must also be the concern of all faculty and disciplines, just as an humanitarian concern must be the active and continuing responsibility of all faculty and disciplines. The fact that we may know more about the social and psychological factors than other disciplines, should not be confused with assuming the major responsibility for the integration or reinforcement of these factors.

Again, if the social and behavioral factors are really important in the training of a physician and in patient care, it becomes the behavioral scientist's responsibility constantly to search for relevant core content and for the most appropriate time to teach this content during the four years of the medical curriculum. Just because we are attempting to define ourselves as a basic science discipline does not mean that we are limited to the basic science years.

One of the most significant developments that will influence behavioral science teaching in medical schools is the establishment of The Behavioral Science Test Committee of the National Board of Medical Examiners. The National Board has been studying the increase in behavioral science teaching since 1967. In March, 1969 an Ad Hoc Committee on Behavioral Sciences was appointed and as a result of the work of this committee, experimental test material was developed. Since behavioral science is considered to be basic to all of the clinical disciplines and occupies curricula time largely within the pre-clinical years, it was decided that the subject should be included in Part I.

The first experimental material was included in the June, 1971 Part I exam. On the basis of the performance data on those experimental items and a review of the need for more emphasis on the biological, psychological, socio-cultural and environmental aspects of behavior, the Executive Committee of the National Board authorized in October, 1971, a permanent Behavioral Science Test Committee and the inclusion of questions in the 1972 Part I Examination. The number of questions will be comparable to the other six subjects (anatomy, biochemistry, microbiology, pathology, pharmacology, and physiology) and the behavioral science questions will be included in computing the total score of each examinee, although a behavioral science subscore will not be reported the first year.

The implications of this development are that the behavioral sciences have indeed come of age, are now gaining "official" academic credibility, and will be entering the medical student survival system with full membership. Even though many behavioral scientists might have preferred to continue to work outside the system, most are going to be needed to plan and work for the continued development of the behavioral sciences. This does not mean that we should abandon attempts to change the present system, but should provide a toe-hold and opportunity to help design a new system, except now we will be playing the game for real!

11. Emphasis on Family Medicine and Primary Care.

With the establishment of new departments of family medicine and programs in primary care, we can expect that this trend will add considerable force to continuing curriculum change. Several aspects of this trend are important to the behavioral sciences.

As medical educators attempt to respond to governmental support, public demands, and the need for continuing comprehensive care, the behavioral sciences will become more and more involved with these efforts; first, because so much of the neglected part of patient care involves behavioral factors, and second, even though our skills and knowledge may be grossly underdeveloped in comparison to the other medical sciences, we still represent the major available resource for teaching, research and evaluation in the behavioral areas. A large part of the curriculum content of any teaching program in family medicine or primary care will require the participation of behavioral scientists.

The research skills of the behavioral scientist will be of special value to these developing programs since so many of the "unknowns" either involve behavioral factors or will require behavioral research skills. For example the needs, values, and practices of the consumer (the patient) are almost unknown. Many medical educators have ideas about patient needs and behaviors, and we know that it is not just the stringent application of good scientific medicine that is required, but we have not identified and documented the nature and dynamics of the human factors involved. Medical science has operated on the very unscientific assumption that if we can control or alter the metabolism, the infection, the pharmacology or the hemodynamics, the behavioral or social or human factors will take care of themselves. We are now in the midst of a reassessment of this tragic error in scientific judgment. The behavioral sciences can not promise solutions, but we do have many of the scientific research skills and methods which will be imperative to any solution.

In terms of teaching content, the behavioral sciences must appreciate and develop the excellent opportunities for bridging and translating behavioral science into clinical medicine. Such conjoint teaching opportunities can help strengthen both areas. Also, the behavioral sciences should be able to help family medicine and primary care programs identify the knowledge, skills and attitudes required and how they can be learned. Since the behavioral sciences have most recently struggled with the task of synthesizing content from a very large area of social science and human biology, the behavioral scientist should be able to help family medicine evolve through this most important first step in academic survival.

Another evolution through which family medicine must pass, is the complicated and hazardous passage into academic credibility and acceptance. Though we are at different evolutionary stages, there is some similarity between the family medicine and the behavioral science situations: we exist in part because of a void or imbalance in patient care and academic medicine; we are relative newcomers to the medical school scene; we have evolved out of a very broad and general informational system; we have many of the same problems in attempting to synthesize a body of information and concepts relevant to the training of a physician; and we have many of the same survival hazards attempting to become established and accepted in a fairly traditional academic system. The behavioral sciences have passed through many of the same evolutionary stages as psychiatry passed thru more than a decade ago. Now, family medicine has appeared on the scene; in many instances as an uninvited guest who happens to have the support of a rich uncle.

Each medical school situation can be quite different, of course. In some schools, psychiatry has been the supporter and promoter of the behavioral sciences, while in other schools, psychiatry has felt threatened and insecure. Likewise, family physicians may be seen as supporting colleagues in some schools and as a threat to the specialist's domain in others. Some medical schools are attempting to establish a clear demarcation between family medicine and primary care with the hope that the specialties will be able to reassemble enough commitment to primary care and continuing care to satisfy the public demand and control the shift occurring in the entire health care delivery system.

There is no way to determine the outcome of this particular trend, but it will do a lot to modify medical education. The behavioral sciences will do well to offer some of their expertise and to use every opportunity to engage in cooperative teaching and research endeavors.

In summary, changes in medical education are occurring at a more rapid rate today than ever before. The eleven trends identified in this paper are not intended to include all of the forces or changes exerting an influence on medical education today. Rather, they represent some of the more active movements and include those trends which will influence, and be influenced by, the behavioral sciences.

Before these trends are replaced or reversed they will most certainly accomplish some real changes in medical education in terms of more relevance, more clinical involvement, more physician graduates in less time, with more flexible and effective learning situations, more self instruction with students with better academic preparation, with more social conscience, and with a rediscovery of the patient and primary care.

The behavioral sciences will have an important role in these new curricula. The hope is that both the physician and the patient will be the better for the changes.

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PSYCHIATRY, THE BEHAVIORAL SCIENCES AND MEDICINE

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PSYCHIATRY, THE BEHAVIORAL SCIENCES AND MEDICINE

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In the foreward to Oliver Cope's Man, Mind and Medicine, (1) a report of the Swampscott Study on Behavioral Sciences in Medicine, Alan Pifer admonished mildly: "It is important for the reader to understand at the outset that the term 'behavioral science', as it was considered at Swampscott, was by no means limited to psychiatry and psychoanalysis, or even to these two applied fields and their basic discipline, psychology."

Since every denial implies an affirmation, we may assume that the behavioral sciences in medicine are commonly seen at this time as including psychiatry, itself, as well as being included organizationally largely within psychiatry.

Actually, part of a survey of the behavioral and social sciences during 1967-1969, which was executed under the direction of the Committee on Science and Public Policy of the National Academy of Sciences and the Problems and Policy Committee of the Social Science Research Council, was published recently under the title Psychiatry as a Behavioral Science.(2)

The use within psychiatry of the phrase, "behavioral sciences," has given an identifying visibility to the behavioral knowledge taught or applied by clinical psychiatry which the use of behavioral science information by other disciplines and persons in medicine lacks. This localizing visibility has been enhanced in several medical schools by departments of psychiatry naming or renaming themselves to include the designation behavioral sciences in the departmental heading.

However, clinical neurology, pediatrics, community and public health medicine, and many preclinical basic medical sciences, to name less than every instance, include frequently within their research, training, or service domains both behavioral scientists and their sciences. Very recently, for example, a textbook has appeared with the title Behavioral Science in Pediatric Medicine.(6)

It is quite obvious that the theory and knowledge which informs education, training, research, and practice in psychiatry can be allocated, like much other scientific information in general medicine, to the commonly accepted and established sciences such as biology, psychology, sociology, anthropology, and their subdivisions. However, a science is determined not by its subject matter but by its methods. Hence, any happening, whether in the laboratory or in the clinic, can become the object of scientific scrutiny and validation. An impressive amount of theory construction and experimental validation of theory by psychiatrists, themselves, has given rise to much scientific knowledge about behavior.

Probably the most cogent reasons, then, for an explicit or implicit designation of psychiatry--a medical clinical specialty--as a behavioral science must be sought not in the taxonomy of science but in the historical and contemporary sociology and culturology of psychiatry.

I do not, therefore, wish to get entangled in any emotion-laden controversy about the classificatory appropriateness of designating psychiatry a behavioral science. In the pursuit of the major objectives of how the knowledge about human behavior can be most comprehensively, most resourcefully, most impactfully, most helpfully, and most relevantly developed, taught and used in medical theory and practice, the labeling of organizational divisions in a medical school is a quite secondary problem. Nevertheless, some of the current uncertainties and ambiguities associated with the teaching of behavioral science in medical schools may be clarified by attempting an analysis of the determinants of the trend to conceptualize psychiatry as behavioral science.

Before trying to specify some of these social and cultural determinants, let us define the behavioral sciences, when they refer specifically to human beings, as all of those sciences concerned with the description and understanding of the human body living as a social person. Although for heuristic and pragmatic purposes behavior and behaving may be conceptualized frequently as if it is not also biological action, there would appear to be no particular logical merit in restricting the term "behavioral science" to the various constructions of disembodied behavior which constitute frequently the conceptual models of psychology and the social sciences. So, too, it is obvious that not all of the independent variables influencing behavior are considered correctly as existing "within" the body. Unfortunately, some human biology still remains the study of ahistorical, desocialized, and depersonalized bodies. The behavioral sciences, therefore, are at least biology, psychology, sociology, anthropology, political science, economics--all writ large--and history, insofar as it is retrospective sociology and anthropology in the widest sense of these sciences.

Historically, psychiatry was the main portal of entry for the introduction of behavioral knowledge directly into its own theory and practice and indirectly, therefore, into the rest of medicine. Certainly most medical faculties today are prepared to grant that the sciences of behavior are at least basic to psychiatry and, hence, indirectly if not directly basic to all of medicine.

Other basic medical science disciplines such as anatomy, biochemistry, microbiology, and physiology were also originally developed and taught in medical schools by clinicians. (5) However, research and teaching in these sciences were subsequently taken over by nonclinical research scientists who established themselves as separate basic science medical school departments. In spite of the creation within very recent years of a few behavioral science departments in the basic science curriculum of the medical school, behavioral science dissemination in medical education and practice has remained largely the responsibility of clinical teachers in psychiatry. Hence, in reality, psychiatrists have been, and are, behavioral scientists if for no other reason than they have represented and do represent behavioral science knowledge in medicine.

Moreover, the development of psychoanalysis within psychiatric theory and practice provided a psychological theory and therapeutic technology under almost the exclusive control and concern of clinical psychiatrists. Both the strength and the weakness of psychoanalysis considered as behavioral science resides in the fact that so much of its scientific validation has depended on clinical research. In fact, one can think of psychoanalysis as an unique instance in contemporary science of a behavioral science without experimenting scientists, if the distinction between basic and applied science, between the scientist and the engineer, has any significance. In any event, however, the psychoanalyst is identifiable as a behavioral scientist and it is he who, because he is in psychiatry, has contributed significantly to the actuality that psychiatry is almost exclusively the representative of psychoanalytic behavioral science.

Shortly after World War II psychology began to demonstrably influence psychiatry through the increasing number of psychometricians and clinical psychologists who came to work in the psychiatric hospital and clinic. This invasion into psychiatry of psychologists educated and trained in university departments of psychology could have resulted in the transplantation into psychiatry of a broader based and basic psychological research activity and in the introduction into psychiatric thinking of the whole spectrum of psychological theory extant in the universities. For various reasons both within and without the practice of psychiatry, the optimal openness of psychiatric thinking to general psychological research and theory did not occur. From 1940 until relatively recently, both because of external opportunity and internal desire, clinical psychology developed rapidly by identifying largely with the theory and practice of the psychiatrist. It was rare during that period to find either a clinical psychologist or a psychiatrist in a medical school department of phychiatry, who was at all familiar with the theory and research of the contemporary general psychology.

The introduction of clinical psychology into psychiatry did not, therefore, result in psychiatry becoming a repository of general psychological science within medicine. Nevertheless, the inclusion of large numbers of clinical psychologists within departments of psychiatry gives further affirmation to the designation of psychiatry as a behavioral science department.

In the assessment of future trends, it is interesting to observe that many university departments of psychology are now phasing out their clinical psychology programs. At the same time, clinical psychological practice is being greatly influenced by other psychological theories than psychoanalysis and is being considerably diluted by nonmedical and nondisease models for the explanation and modification of behavioral impairment. We are witnessing the secularization of psychotherapy into education and the widening of the therapeutic community into the environmental evocation and shaping of adaptive behavior by other social institutions rather than only by those social organizations designated as hospitals.

Many of the clinical psychologists who are now in medical school psychiatry are change agents for the introduction into psychiatric and general medical education of this recent behavioral science knowledge and its applications. The conflict with traditional psychiatry is obvious and its productive resolution will create several different organizational adaptations within medical education which will then offer an opportunity for a study of their effectiveness and efficiency.

For at least the last 30 years, the sciences about social man, particularly social psychology, sociology, and anthropology, have been represented increasingly in psychiatry. Social class, life-style, and cross-cultural observations have long aided epidemiologic studies in general medicine as well as in psychiatry. More recently, changes in psychiatric practice relating to the therapeutic community and to group therapy have necessitated heavy reliance on the knowledge about the organization and processes of social groups. And in the last decade, the preoccupation of psychiatry with the development of social and community resources with which to react to persons defined as ill, and with which to reduce behavioral impairment and to promote increased behavioral competence for persons not yet defined as sick has put psychiatry into close association with social scientists. Such needs have also encouraged psychiatry to expand on its own initiative, clinical research into the natural setting of the community.

Social scientists, therefore, are represented in greater numbers in departments of psychiatry than in other divisions of the medical school. Clinical psychiatrists are also doing an increasing amount of teaching of social science and of research into the social context of behavior either with or without the collaboration of social scientists.

Hence, like the situation obtaining for psychoanalysis and psychology, the department of psychiatry is both the major organizational home within medicine of the social scientists and a substantial source of the teaching, application, and research development by psychiatrists of social science knowledge. This latter fact, particularly, can be adduced as an additional justification for calling psychiatry a behavioral science.

It is of more than derivative interest to recall that the enrichment of psychiatry by the social sciences has had a parallel reciprocity. Many sociologists and anthropologists have been influenced by psychoanalytic and psychiatric thinking. Even though many such scholars worked outside of medicine, they nevertheless helped form relevant social science theory and knowledge for use in medicine and psychiatry. Thus, the psychiatrist has been offered from the university, gratuitously and frequently, easily assimilable and applicable behavioral science information.

The increasing concern of psychiatry and of medicine in general with the neurosciences and with behavioral biology has been expressed in recent years by the growing number of neurophysiologists, biochemists, psychopharmacologists, geneticists, psychophysiologists, and neuropsychologists who are members of the teaching and research faculties of departments of psychiatry. The curricula of psychiatric residency training and education also reflect this developing interest in behavioral knowledge.

The advent of psychoanalysis into psychiatry and the consequent emphasis on psychologic constructs to describe and to explain behavior and to direct behavioral change techniques was one of the reasons why medical school departments of psychiatry had moved away, largely by 1945, from an intimate, sometimes intradepartmental, association with clinical neurology. Perhaps more importantly, the theoretical models of brain structure and process extant at that time did not accommodate very resourcefully the conceptual variables of prevailing psychological theory.

However, while the break away from neurology was occurring, psychosomatic medicine was evolving and creating research, teaching, and clinical practice collaboration between psychiatry and many other medical departments and specialties. The earlier problems in correlating brain and behavior which made clinical neurology and its associated neuroscience less valuable to the psychiatry of two or three decades ago did not inhibit the development of psychosomatic medicine. Psychiatry reestablished a close affiliation with clinical medicine by way of psychosomatic theory and research. Psychosomatic thinking and experimentation flourished along with the progress in both the basic and the clinical medical sciences in the study of general peripheral neurophysiology.

By contrast, the new contemporary thrust in behavioral biology and the return of the neurosciences to psychiatry has been largely due to the evolving theory and knowledge about central rather than peripheral neurophysiology. This trend has culminated in the growing experimental evidence that, like the voluntary somatomotor system, autonomic effector action is governed by feedback and memory information and is sensitively modulated for adaptive learning, both respondently and operantly, by the general integrative activity of the central nervous system. (3)

The emergence in medicine within the last decade of a clinically relevant behavioral biology is steadily eroding the importance of psychosomatic medicine as a separate discipline. (4) This transformation of psychosomatic theory largely associated with psychiatry into a general clinical psychophysiology for all of medicine is both a consequence and a determining cause of the changing role of the behavioral sciences in medical education, theory, and practice.

On the one hand, existing basic biologic science departments in medical schools are becoming interested and concerned with the biology of behavior and are extending their research collaboration with behavioral scientists. This is occurring most notably, perhaps, between pharmacology and experimental psychology, but also to an increasing extent among physiology, psychology, and the social sciences in the study of psychosocial stressors. As has already been suggested, medical neurophysiology is extensively working and teaching in the domain of brain and behavior. Behavioral genetics and molecular biology is another germinal collaboration within basic medical science.

All of this suggests the continued growth of the inclusion of behavioral scientists within existing basic science departments of the medical school. It can also be used to document one of the most important arguments for the creation of a basic medical behavioral science department, that is, the facilitation of collaborative biobehavioral research and teaching in the total basic science group in medicine. Particularly at the basic science level, the human body should be researched and conceptually presented to students as a living social person.

So, too, the presence of a general basic science and clinical psychophysiology, by which we always mean, of course, a psychosocial physiology, tends to enforce the fact of a normal, that is to say, of a medically ubiquitous psychophysiology. The older concept of psychosomatic medicine, identifying a few diseases as within its special ken and looking to psychiatry as its preferred authority, emphasized, wittingly or no, that knowledge about the behaving person was important only for those patients formally labeled with a personality-specific or a conflict-specific diagnosis selected from the psychiatric nomenclature of deviance.

Teaching behavioral knowledge collaboratively with anatomy, physiology, biochemistry, and other basic medical sciences, without idiosyncratic and adventitious earmarks that communicate to the medical student a highly restricted or special use of such information, must be the goal of any teaching program in behavior, whether implemented by a department of psychiatry or by any other department.

In assessing trends in medical education, we must consider at least one additional consequence of teaching human behavior the way other basic medical science information is taught, that is, as basic to all of medicine and not merely to psychiatry. If the outcome is to create in medical students, and subsequently in practitioners, the desire and capability of bringing behavioral information to bear on every medical problem-seeing and problem-solving task, then the consultation and referral relationships of nonpsychiatric and psychiatric physicians will probably alter considerably. The direction of this change toward either an increase or a decrease in the use of the psychiatrist for consultation and therapeutic referral cannot, I think, be predicted confidently. One could hope, however, that the nonpsychiatric doctor might be more resourceful, more effective, and more confident in the comprehensive understanding and management of the patient. He might then be less inclined to neglect the behavioral aspects of illness, less ready to intimidate himself from being an effective psychotherapist, and less apt either to refuse irrationally to refer to the psychiatrist or to make such a referral unnecessarily.

Some of the other intellectual disciplines concerned with the social organization of human behavior, such as political science and economics, are scarcely represented at all in medicine or psychiatry. The recent addition to the Harvard Medical School of economists placed organizationally directly under the Dean indicates presumably an uncertainty both as to whether such disciplines are to be considered behavioral science and as to where such scholars should be placed in the departmental terrain of the medical school. Nevertheless, it is obvious that in terms either of epidemiology or of the adequate provision of preventive and reparative health care, economic theory and practice may have more to do with physical and sociocultural sanitation and with the efficiency and effectiveness of the doctor's job than, for example, a myopically exclusive concentration on the sociology of the city.

With the exception of these latter subjects of economics and political science, the behavioral sciences in medicine are represented in almost every department of psychiatry either by some combination and number of behavioral scientists, themselves, or by psychiatrists who represent more or less adequately some or all of the behavioral sciences.

Administrative concerns and constraints and the associated security operations of the faculty are likely to dominate the discussion of values and ideas in medical education. It is necessary, therefore, to guard vigorously against being caught up in the pressure to preoccupy oneself with questions of feasibility and preference about the organizational place of behavioral science in medicine. For purposes both of demonstration and assessment, all of the readily obvious organizational possibilities are in existence. These may be summed up as follows:

1) Behavioral scientists in departments of psychiatry and in other clinical and basic science departments with full-time or part-time appointments either exclusively within the medical school department or conjointly with other university departments or with separate schools;

2) The divisional or sectional organization of the behavioral science faculty within a department, particularly within a department of psychiatry;

3) A formally combined department of psychiatry and behavioral science;

4) Behavioral scientists attached to some administrative unit;

5) A separate department of behavioral sciences.

The independent department of behavioral science is an organizational arrangement that makes most overt the basic concerns of psychiatry about the teaching of behavioral knowledge in medicine. A fundamental issue, present in any medical educational relationship between psychiatrists and nonpsychiatric behavioral scientists, centers around the assessment by psychiatrists of the adequacy and validity of theories of behavior and of the relevant and appropriate applicability of the information and techniques engendered by those theories. This poses the related problem of the extent to which psychiatry can or should control what knowledge about behavior and behavioral change is taught, by whom, and where in the curriculum.

Obviously, psychiatry like every medical specialty is eager to develop or to seek out new and useful knowledge in order to do the doctor's job more effectively. Neither psychiatry nor the rest of the clinical medical disciplines are accustomed to depending on a basic science department of behavior for the development and introduction of new behavioral knowledge. It must be recognized, too, that currently there is a distinct trend in the medical school for clinical medicine to teach more and more of its own basic science. From this viewpoint, separate departments of behavioral science may be bucking a historical current. Departments of psychiatry, historically lacking a basic preclinical ally of a department of behavior, may now find themselves in the vanguard of medical change by having remained and expanded as combined basic and clinical science departments.

Whatever the direction and outcome of these current trends, the following essential directives seem pertinently urgent with reference to psychiatry and the behavioral sciences in medical education:

1) It is essential to achieve and maintain an integrated presentation of theories and information about the behaving human body. Medical school curricula of behavioral science should not, as they now do, arrange themselves into bimodal content distributions of behavioral biology and the psychological and social sciences. Neither should theories of human behavior which have become professionally comfortable for psychiatrists prevent the teaching, examination, and use of other theories and of the information validated experimentally under their aegis.
2) Whatever the medical organizational source of the behavioral curriculum, it must be taught and applied in an intimate collaboration with the teaching and application of anatomical, physiological, pharmacologic, biochemical, and other basic medical science knowledge.
3) The ability to conceptualize and to understand a behaving person must be taught and learned as a basis for subsequent general clinical application to any medical problem and to any person of medical concern whether defined as normal or labeled as a psychiatric abnormality.
4) Mostly because of the recent rapid development of the be-

havioral sciences, the behavioral scientists, themselves, should be present on, or work closely with, both preclinical and clinical medical faculties in order to adequately and critically represent the knowledge and methods of their disciplines and to supervise and conduct the appropriate research into problems of medical relevance. When this organizational base of the behavioral scientists is within a department of psychiatry, these scientists must have support for their scholarly autonomy and authenticity intradepartmentally as well as in research and teaching activity outside the department.

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Section B

BEHAVIORAL AND SOCIAL SCIENCE PERSPECTIVES

Anthropology in Medical Education
Charles C. Hughes, Ph.D.
Donald A. Kennedy, Ph.D.

A View from Psychology
Murray Wexler, Ph.D.

A Biobehavioral Curriculum for Medical Students
Sol Kramer, Ph.D.

The Teaching of Economics in Schools of Medicine
Ralph E. Berry, Jr., Ph.D.

The Teaching of Political Science in Schools of Medicine
William J. Gore, Ph.D.
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ANTHROPOLOGY IN MEDICAL EDUCATION

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Our purpose is that of commenting on relationships between anthropology and medical education. The obvious first step is to clarify what we are talking about in terms appropriate to the task at hand. Let us therefore try to do so--briefly. Yet it is not so easy to characterize anthropology succinctly (or, perhaps, any discipline for that matter).* A dictionary definition does not really do it, and the trouble with not characterizing or defining it at all is that we may each think of its corporate nature in much the same way as the several Indian blind men conceived of the totality of the elephant--we take the little we are familiar with for the whole of the matter.

At some levels there is obviously considerable overlap among the several behavioral science fields in concept, terminology, and method--one of the reasons, no doubt, that grouping them together into a "behavioral science" division or department is so easily justified in a medical faculty. (It is interesting, by way of comparison, that there are no "biological science" departments in medical schools; this has to do, no doubt, not with degrees of differentiation of the broad

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(*) Cf. Two recent publications that bear on this problem as it is related to our present concerns: Von Mering and Kasdan (eds.), 1970; and the report of the Behavioral and Social Sciences Survey on anthropology, (1970), Smith and Fischer (eds.)

subject matter areas but rather with historical recency and relative functional importance of the behavioral sciences in the medical education scene.) But internal differences do exist, of course, especially at the level of the philosophic configuration in which the world is viewed. So, with apologies to our colleagues, we will offer a brief characterization of the field of anthropology that takes the form not of a definition, per se, but rather of a sketch of the main ideas of the discipline, those that in their interaction comprise its basic structure.

There are several such major themes, assumptions, or conceptual orientations, that interweave the diverse researches and problem-choices made by practitioners of the field; and such assumptions, for the most part implicit, are operative in an "anthropological" characterization of a problem and its study. They constitute a hidden agenda, a body of usually unverbalized understandings in discussions among anthropologists--and often, therefore, by reason of not being made explicit, an impediment to fundamental communication across behavioral science disciplinary barriers. Let us, therefore, try to isolate such basic themes or assumptions, for they inform many of the methods, techniques, and concepts employed by practitioners of "anthropology" and after that consider what contributions these may make to medical education.

We would see six basic themes as characterizing the conceptual frame of reference in which anthropological inquiry is conducted, themes which, taken together as a "syndrome," have differentiated it for a long time from neighboring behavioral sciences.*

(*) Some passages in the next several pages are adapted from the introduction to Charles C. Hughes (ed.), Make Men of Them: Introductory Readings for Cultural Anthropology, Chicago: Rand McNally, 1972.

The first of these is the species-centered character of the field. Regardless of how widely each of the behavioral sciences may range beyond their implicit intellectual foci and of how many other contingent phenomena they begin to study, such problem-frameworks seem to remain as basic anchoring points that implicitly inform many discussions of the nature of the fields. Thus, if it may be proposed that for sociology the primary reference concept in the study of human behavior is the concept of society, its forms and sub-systems; and for psychology as a discipline the central focus is on psycho-biological process in one form or another; then for anthropology, such a point of entry would be man taken in the biological sense of an entire species, homo sapiens. Thus it is clear that the three primary behavioral science fields are not simply differently-shaped pieces cut from the same cloth; on the contrary, they differ rather markedly so far as the nature and implications of their points of entry into the empirical world are concerned.

Again, it should be stressed that the natural history of inquiry in the evolution of each of the behavioral science disciplines has taken them into many common problem areas, such that it is sometimes difficult (and often unnecessary) to discern whether the given investigator is a sociologist, psychologist, or anthropologist. Thus, for example, studies of socialization have been done by all three disciplines, studies of social organization, mental health, etc. But there usually remains, in an almost atavistic manner, something of the attachment to, or "imprinting" from, the central stamp of the disciplinary assumptions and orientations that give coherence to the body (or "syndrome") of concepts distinguishing each discipline and serving as corporate values for the group of scholars differentiating themselves by use of the disciplinary label.

However difficult it is for any one person to live up to the demands of such an intellectual commitment (the day of Alfred Kroebers and Ralph Lintons has apparently passed), it is such an open-ended commitment that, more than anything else, provides the unifying concept for anthropology as a discipline and creates a degree of intellectual coherence out of studies of man's evolutionary past and current differentiation, bodily form and mental functioning, settlement patterns and social organization, artifactual manipulations, symbolic productions, growth and development--in other words, nothing that is part of the life and behavior of man as an animal form is excluded by academic fiat from corporate investigation. It is, then, a model for the formation of discipline or field of study that is clearly based on those of the biological sciences (such as mammology, herpetology, apiology, entomology, etc.) This intellectual commitment to what is still often called the "study of man" is frequently used as an example of the "holistic" approach so basic in anthropology--an open-ended, "wide-angle vision" rather than "tunnel-vision" in approaching the conceptualization of a problem.

A second theme is the preference for natural settings in studies of human behavior. By and large, anthropology is very much a field-oriented enterprise, looking to the "natural experiment" as a source of variations in data. This includes, of course, an emphasis upon--but not an exclusive concern with--observational and participant-observational techniques as supplementing the different kinds of verbal interviews (structured and unstructured) variously used by other kinds of behavioral scientists.

While it can be argued that because of the investigator's presence in the research situation the object of inquiry is thereby contaminated, the counter-argument can be made that the quality of date thus obtained is worth the cost in whatever degree of artificiality of conduct that may occur because of the researcher's presence. In addition, being in the action affords the chance to observe not only the real life situation of the persons being studied, but also the degree of correspondence between self-reports of attitude and actual behavior, with an opportunity also to follow up any discrepancies with free-structured interviews.

Such observational and participant-observational methods supplement, and do not replace, data gathering techniques based upon verbal interviews. They simply enlarge the range of instances upon which conclusions and inferences relating to the behavioral process being studied can be based, bringing in, for example, the "language of gesture", the structuring of interpersonal contact, the effects of "unprogrammed" events in the daily social round, as well as the parameters of the physical setting in which the behavior occurs.

A third theme is the pervasiveness of an ecologic perspective. Closely intertwined historically with the development of anthropology as a discipline has been concerned with interrelations between man as an evolving species and the press of his total environment. Indeed, it could not be otherwise, given the commitment to the first theme; for the very development of man out of proto- and pre-hominid primate forms was apparently strongly influenced by particular climatological and topographic conditions. But the concern with man-environment relations in both a behavioral and psychological sense and the degree to which these influence social and cultural forms are also evident in the pragmatic catgorizing of much anthropological data--witness, for example, the common breakdowns of societies into "hunters and gatherers," "agriculturalists," "peasantry," "industrialists," and the like.

The inclusive term for such an orientation is, of course, "ecology" a term much used these days (and equally as much abused). "Abused" in the sense of often being conceived in an overly-restrictive and too narrow mode such as the static, structural sense in which it is often employed to refer simply to settlement patterns or aggregate social data. But the term in actuality comes from, and makes reference to, the very essence of life process: attempts at adaptation, accommodation, activity, and adjustive behavior on the part of an organism or group of organisms--adaptation either to outer environing conditions of life, or to each other (e.g., matters of population density, of hierarchical power structuring and "pecking orders," etc.) The term, indeed, has the power to inform a wide range of particular investigations which relate to the dynamics of behavior, either in individual or in group terms. It may be suggested that the behavioral science theoretical approach labeled "structural-functional analysis" is, with sociocultural content, simply another expression of the basic ecologic perspective on events in nature; for the intent here, as with ecology more generally, is to discern the many varieties of the functional coupling of events and structures.

With the human species, ecologic studies become more complicated than they do with infra-human orders, for another set of parameters is introduced into the basic dialectic with nature: elaboration of the psychological transactions with the environment in the form of perceptions, projections, rationlizations and repressions, anticipations and aspirations, affect-laden symbolizations and images, abstractions and class concepts, etc. all heavily influenced by a specific social context. It is this capacity of the human organism for complex psychological relations with the environment which underlies both the development of shared group systems of belief, value, and assumption (in one term "culture"), and the development of complex inner worlds of motive, sentiment, and normative evaluation; and the ongoing stream of behavior is in some senses a compound of such group-structured orientations and the individual compromise with those environmentally-based (i.e., socially-based) parameters for behavior.

Another theme is an ingrained evolutionary and diachronic perspective. Although not all problems demand it and obviously not all anthropologists employ it as a perspective of choice, there is, nonetheless, built into the corporate frame of reference a strong awareness of the workings of time in shaping the observed structure or event. Ethnographies typically begin, for example, with placing the community or tribe in its historical context on the basis, of course, of the common-sense assumption and theoretical construct that man is a "time-binding" animal, that in man the past lives in the present to an exalted (and often deplorable) degree. A theme like this one has profound implications for the study of human behavior and sociocultural systems; for one thing, it insistently urges translation of static concepts of "structure" into dynamic concepts of "process" and asserts change and alteration of pattern as the norm, helping bring about a more productive relation between concept and reality.

Wide swings of investigatory styles and theoretical predilections aside, a perduring feature of the "culture of anthropology" is the implicit emphasis upon process and interaction of empirical events over time, whether the content be morphological or societal. Such a parameter of the frame of reference explains, for example, the conjoining (in introductory courses) of human evolution with the growth and development of human society and culture; indeed, to do so helps illuminate many of the most striking aspects of "human" nature when the phrase is used in its broadest comparative sense, such as those features of homo sapiens as a primate which underlie his capacity for culture and for a distinctly human mode of adaptation to the environment.

It is with respect to this theme, for example, that studies by physical anthropologists, zoologists, and ethnologists of primate behavior are relevant in elucidating some of the social organizational and adaptational modes possible given particular stages of somatic and cortical development. Although the "origin of language", for instance, will never be sharply specified in a temporal framework, the hypothesis is well-evidenced that survival possibilities of australopithecine and other pre-hominid forms were immensely increased when they achieved better coordination of group efforts through development of that highly effective signaling and information-storing system, language, a development itself functionally evolved through interacting factors of habitat, posture, omnivorous diet, and enlargement of the frontal lobes of the brain.

The congeniality of a long-range historical perspective to a fuller understanding of "human" behavior is thus one of the areas of contribution of the culture of anthropology to the behavioral sciences, although--as noted above--not all practitioners of the field may construe their problems in such a framework. That "long-range" perspective is indeed enormous and, if internalized fully, forces one to acknowledge how parochial and circumscribed is the usual anthropecentric sense of time with which we operate. If nothing else, it boggles the mind to realize how miniscule a portion of the span of organic life on this planet is occupied by anything that we can justifiably call human experiences: If the orgin of the earth itself is placed at about 3 billion years ago (probably a conservative estimate) and if this estimate were to be concretized by a book consisting of 3,000 pages (each page representing one million years), the point at which the very earliest (and crudest) forms of man-like apes appear would be somewhere on page 2,999: earliest forms of "modern" man (some 50,000 years ago) close to the bottom of the very last page; the birth of Christ somewhere in the last word in the last line; and the beginning of the twentieth century as the final period in that last line.

There is something else than merely philosophic bewilderment that the long record of the unfolding of life and its forms accomplishes. It underscores an essentially dynamic and interactive point of view for all phenomena of life in which concepts of "structure" serve as "half-way house" concepts in the service of understanding patterns of process.

But one other area of more concrete implication is that of the differential susceptibilities to disease based upon phylogenetic factors--racial differences and their implications for differential epidemiological profiles in various populations. The interrelations between the "sickle-cell" anemia, malaria, the evolution of agriculture in the continent of Africa, and the vestigial susceptibility to the anemia (and protection against malaria) in persons of Negroid descent is but one example from a wide field. Indeed, taking the long view of human history, man's development can be seen as a series of multifarious transactions between culture, behavior, and biology.

A fifth theme is closely tied in with a central concept of the entire discipline, the concept of culture. It is the pervasiveness of the symbolic and meaning dimension in human behavior. This is perhaps expressed most succinctly in the phenomenon of language, with its abstracting and generalizing properties, but language is of course by no means the only way in which shadow worlds of meaning interpenetrate empirical events. In Whitehead's phrase, "Symbolism has a tendency to run wild, like vegetation in a tropical forest." Sounds, physical sensations, material objects, social events--all and anything may function in the dual capacity of expressing one process while at the same time being an indicator of a different definition of the situation. The event or object, when functioning symbolically, must be interpreted in terms of that world of meaning beyond itself to which it has reference if a full understanding of its importance in human affairs is to be achieved. With reference to the topic of concern in this paper, look at the famous mask of the modern priest-healer; the clinician's white coat. Worn by anyone, it confers--no, it means to the patient authority, skill, and wisdom. Or take the (formerly) blinding whiteness of the surgical room; somehow the virginal whiteness betokened safety and cleanliness, antisepsis carried to the extreme. Beyond color there is the ability of symbols--dress, seating patterns, posture, titles--to convey status, i.e., to indicate, without explicitly saying so, relative power ranking and special privilege--in an ongoing social system. Indeed, not only in a hospital setting, but in most situations of human behavior, the forms of symbolism, the ability of any one thing or object to serve as an alter ego for something else or some other situation, are protean--especially when the matter is viewed in a cross-cultural framework.

A final theme that brackets anthropological inquiry is perhaps its most well-known characteristic: an implicit cross-cultural and comparative perspective. Although the task is immense, the field corporately takes seriously the commitment to Man writ large in considering the scope and power of a generalization concerning human behavior and social process. As the current wide interest in comparative studies in behavioral science fields attests, far from serving simply an anecdotal function, contrasting and diverse ethnological data bearing on the same problem are vital in cleansing variables of parochial content and creating that degree of conceptual equivalence required for theory development.

Such an approach, which is almost instinctive in anthropology, derives, indeed, from several of the principles sketched in above. Insofar as the ambitious subject matter of the discipline is the "study of Man," the list of diverse instances is drawn as broadly as possible as foundation for generalizations--from the small bands of Bushmen in the Kalahari Desert to the high civilizations of the Andes, the ghetto dweller, political elites in modern Africa, or Tungus reindeer herders of northeastern Siberia. Return for the moment to the illustration of color symbolism referred to above. To those of us in the Western tradition, the color white conjures up positive values: sanctity, cleanliness, holiness, goodness and purity, etc. Contrastingly, in many contexts the color black signifies the opposite values; indeed, it is culturally the predominant color of grief and mourning. But for Chinese groups white, not black, signifies grief and bereavement; and for some Mexican Indian groups red serves a similar purpose. In each case, through socialization, the color presented "means" the same thing to members of the group and engenders a common affect. From one point of view in a cross-cultural perspective, it is not necessarily a given color per se that is important, but the fact that so many groups do have affect-laden symbols (color and otherwise) by which they "express" and thereby externalize psychological processes in response to a crisis event. Beyond color, of course, all the data of human behavior are subject to diverse cultural differentiation and expression, and this includes such "sub-cultural" phenomena as symbolic and value differences between ethnic groups of socioeconomic classes.

These several themes or orientations represent one way of characterizing the "hidden agenda" in an anthropological frame of reference. But what might they (and the factual that emanate from them) have to do with medical education?

Anthropology and the Future Medical Practitioner

Let us consider that there are three ways a given discipline can make intellectual contributions to a curriculum not its own. (Whatever changes in affect and value may occur are something else--not irrelevant but simply not discussed here.) The first is training in specific skills, either those of data gathering or analytic techniques. The second contribution is introducing the facts or empirical knowledge of that given discipline--information. The third contribution, the most difficult kind of objective to achieve, is conveying to the participants in that curriculum what is usually an alien theoretical or conceptual frame of reference in terms of which those empirical facts make sense--a perspective. This latter contribution is difficult because it is not so easily bounded or packaged as are facts or skills, and because its acquisition usually is the result of a gradual evolution and seasoning of thought on the part of the student, rather than the outcome of a simple act of disclosure. (It is not, in short, one of Ehrlich's "magic bullets.")

If the formulation of a more comprehensive frame of reference is a process of synthesis and integration requiring time, this may explain one of the covert difficulties in regard to the teaching of behavioral sciences, and particularly anthropology, in medical schools; for--as will be argued later--perhaps the most critical outcome to be desired will not be that of either data gathering or simple acquisition of empirical facts about human behavior, although both these will be involved to some degree. Rather, the most long-lasting and pervasive effect to be sought (which not every student is able or willing to do) is a change or enlargement of the conceptual frame of reference with which the student looks at any disease process, so that he sees it as occurring in context or interaction *field* of human behavior in which the patient is a participant (along, indeed, with the physician himself as one of the interacting units when the issue is that of diagnosis and/or treatment.) The goal is, then, to give the student an ability to move with ease along what might be called a continuum of *progressive contextualization* in regard to any given health/disease problem--to use, appropriately and heuristically, alternative perspectives not based on reductionistic parameters. He will not, for example, feel compelled to translate *all* issues of pathology into cellular terms, but will be able to see malfunction at several levels of dynamic organization. Some might prefer the language of general systems theory for conveying such a "perspectivistic" image, a language of sub-systems within environing systems of functional interrelations. Indeed, such language is concinnous with the biologistic frame of reference the student learns to employ anyway--in which the cell is accepted as the basic unit of living matter, analyzable in its own right and exhibiting system properties at one level of analysis while at the same time entering into environing systems of tissue, organ, organism, etc. without losing its phenomenal integrity. In this view, then, the task for the behavioral scientist is simply to gain an opening for the field enlargement of those elements of nature that can be seen as exhibiting such partwhole system composition and interactions, such as person in his own right, and person in a social and cultural system, sub-systems of larger social systems (e.g., emergency room in a hospital structure, etc.). Perhaps, to sum up this point with jargon familiar to the anthropologists (since this is what this particular paper concerns and not the whole of the behavioral sciences), the third way in which a discipline can make a contribution to an outside curriculum is to achieve at least something of a change in the "world view" or "ethos" of those exposed to that curriculum--to lay hands on, and shape into more comprehensive form, their epistemology.

Skills

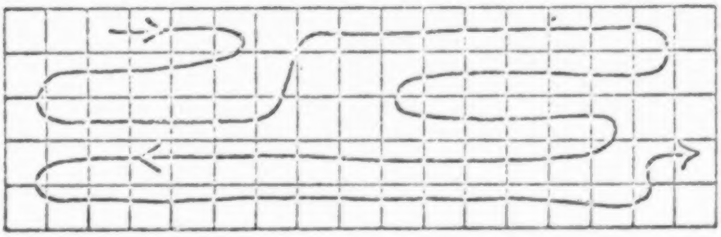
Let us return to specifics. What kinds of data gathering or analytic skills might anthropology have to contribute to the future medical practitioner?

What is apparent when we look at anthropology as a whole, i.e., including the several sub-fields such as archeology, physical anthropology, linguistics, sociocultural anthropology, and psychological anthropology, is that there are specific data-gathering techniques in some of those areas that, if related to medical practice, are more related to the research questions that contribute to the domain of knowledge for practice or preventive medicine than the actuality of practice itself.

Techniques in genetics, hematologic research, osteology, growth and development, for example, are part of the physical anthropology (or, in other, equivalent terms, "human biology,"); similarly, archeological techniques for studying the antiquity of disease ("paleo-epidemiology") would seem to have very little direct bearing, except in a highly derivative sense, on contemporary medical practice.

On the other hand, take social and cultural anthropology. Traditionally one of the chief modes of data-gathering here has been that of the interview, what is sometimes referred to as the "non-structured" interview (i.e., it does not follow a strictly-outlined and tightly-phrased sequence of questions). To say that an anthropological interview is "non-structured," however, conveys to some readers a misleading conception--one to the effect that there is no point, no framework, no guiding conceptual objective being sought in the interview; that the proceeding is an anecdotal gossip session. On the contrary, the typical sociocultural anthropological interview is in fact *problem-focused*. It is clear in its strategic outlines; what varies are the tactics. If the researcher is interested, for example, in ascertaining the patterning of kinship roles and kinship relations in an unfamiliar group, he well knows what he is after--but he may try alternative modes of approach in getting data from his informant. The entire proceeding can better by characterized as a "guided dialectic," a moving to and fro, an *evolving* toward the solution of the problem being investigated, rather than one of a too-highly-prestructuring of the questions in rigid form, a prestructuring which, indeed, may well *presuppose* without any exploration that the very questions being asked are the most appropriate and effective ones *to* ask.

The structure, or the organization, for this kind of interview can be visualized in the following way, (with both the diagram and comment taken from Spicer, 1952, p. 126):



HYPOTHETICAL COURSE OF AN INTERVIEW

> In the diagram the squares represent the items of information which the student has systematically determined that he needs for the solution of a problem. The curving line represents the course of the interview. It may not begin at the point the interviewer had expected, or disclose the items in the order in which he had thought of them. Perhaps a first interview, moreover, does not touch on all the items. Nevertheless, through skillfully keeping the interviewee talking along the lines of his own interest, and in his own way, answers to most of the questions can be obtained—perhaps to all those concerning which the interviewee has anything valuable to offer. Additional items of information may be obtained in a second interview or from interviews with other persons.

Another feature of this kind of anthropological interviewing, one that is often not remarked upon, is that the anthropologist must establish a long-term communicational climate that is conducive to the gathering of data and the cross-checking of those data over time. There must be established, in short, a rapport and mutual confidence between anthropologist and informant that allows for the fullest possible exploration and delineation of the topic or problem in question. Saying the latter is, then, to suggest immediately a possible contribution of anthropological data-gathering techniques to the training of the future medical practitioner. For if the patient coming to the doctor with symptoms--of whatever kind--does not perceive a congenial communicational environment and is not encouraged by the doctor to enter with him as a respected and indispensable participant in the dialogue that explores the problem and attempts to outline solutions, then this important aspect of the student-physician's training will have been deficient. Laboratory tests give only part of the necessary data; in many clinical instances, the host for that disease process (the patient) can contribute even more vital data (such as responses to the questions, "Where does it hurt?" or "What kind of pain is it?").

To characterize a sociocultural anthropological interview in the above fashion is not, of course, to assert that nothing like this will be done in either medical education or medical practice until anthropology enters the scene. Indeed, in many instances now the effective practitioner is "effective" at least in part because he does conduct his data-gathering along some such lines as those sketched in above. Nor is it to assert that it is only the contribution from anthropology that would provide the necessary training in this kind of data-gathering for the student-physician; in a number of medical schools at the present time there are courses in the "doctor-patient relationship" that include the interviewing process and incorporate some of the ideas and rationale of this kind of interview. But it probably is fair to say that anthropology can contribute to the medical education process in this respect, both by reinforcement of the basic purposes and structure of alternative types of interview, by inculcating an awareness of the situational and sociocultural dimensions of the interviewing process, and--especially--by offering experience and instruction in such data-gathering techniques when the problem of interest to the student is larger and more diffuse than the relatively simple doctor-patient interaction--such as one in "social medicine," "community development," or some of the others for which data-gathering in community settings is required.

There are other features of the "anthropological" interview that bear mentioning in relation to training for medical practice, such as the sheer facts of language usage and of vocabulary. If the anthropologist is exploring a given topic with the informant and the latter uses an unfamiliar "native" term to refer to some feature of the situation, the anthropologist makes certain that he explores the dimensions of meaning until he has accurately understood it. The well-trained anthropologist is sensitive to differences in meaning and differences in perception of familiar things between himself and someone from another culture, for this is part of the fabric of culture. A not unimportant implication for the medical practitioner is therefore suggested viz., that he constantly be aware of possible differences between him and his patients in use of language and even what appear to be "common" terms for sickness, especially those coming from different socioeconomic and ethnic backgrounds of his own society, an awareness that expresses a "sociolinguistic interest". The term "high blood," for instance, does not mean "high blood pressure" to American blacks in the ghetto; and references to "hot food" in a diet by Puerto Rican and other Spanish-speaking patients are likely to mean a reference to the Galenic-derived system of classification of foods in a pervasive belief system of disease causation and etiology that is not based on their thermal qualities (see below). But it isn't just exotic words or notions that are not understood between doctor and patients. Studies have shown that the doctor using the technically correct term for a part of the body or one of its processes frequently does not communicate in the framework of layman's English which the patient brings to the situation. "Have you voided today?"--how commonly, in the patient's world, is that phrase used to refer to urination? (cf. Samora et al., 1961).

There are only a few ways we can receive information from the world around us, and all our "data-gathering techniques" are channelled through one or more of these modes. We can see, hear, touch, smell, taste. When we speak of interviewing, implicitly the reference is to hearing--listening to what someone else says in response to our own verbal cues. We have spoken already of the areas of overlap in use of such a technique between anthropology and clinical practice. But it should also be made explicit that, whether recorded or not, much observing also goes on in the "interview," and indeed it forms an extremely important independent part of the total data-gathering process for both the anthropologist and the physician. The anthropologist in the field records his observations not only of the physical and social setting (e.g., house, work area, etc.) in which an interview occurs, but also the appearance and behavior of the person being interviewed, the reactions of others around him to the dialogue, the effects on the person of the interviewer's questions or comments, and so forth. He looks at and records the "nonverbal" communications that are going on. In addition, beyond the data-gathering involved in talking with a person, the anthropologist makes many "respondent-free" observations--descriptions of what he sees going on in a village, on a street corner, in a hospital ward: patterns of interaction or behavior, modes of sitting, of dress, of house-building or baby-birthing. In other words (depending on the problem, of course) the anthropologist records his own observations of what is going on in addition to what a person or persons tell him about what is going on (using whatever extensions of his eyeballs are available as windows into empirical events, such as cameras).

Clearly this observation-based mode of data-gathering is another area of skill in which anthropological research techniques and those of clinical practice overlap. The physician's initial notes as well as the continuing case record usually include reference to the patient's appearance (mode of dress, coloration and texture of skin, clearness of eyes, appearance of throat, tongue, ears, relative stockiness or height, etc.), and his behavior (gait, posture, speech, eye-contact, etc.). (He may also use other sensory modes, such as taste, smell, and certainly touch.) While usually such observations (both in anthropology and clinical medicine) are used in a fairly rough and unsystematized manner, there are techniques available in terms of which group norms have been established. In anthropology one such body of work is known as "kinesics" (cf. Birdwhistell, 1970), and others have made attempts to quantify and pattern overt aspects of behavior in a similar way (e.g., Hewes, Caudill,). The practical implications of such knowledge for medical practice (anticipating here for a moment the next section) can be illustrated by a case now well-known in medical behavioral science, in which a Navajo Indian acted toward outsiders in a perfectly "natural" Navajo manner and his behavior was interpreted by white police officers and hospital attendants as indicative of schizophrenia (Jewell, 1952). His interpersonal demeanor was that of appearing downcase and out of contact with reality--avoiding other persons' eyes, not responding to questions, exhibiting "bashfulness." (In his case, the matter was not particularly helped by the fact that his physical appearance was interpreted by some as Mexican, and he was spoken to only in Spanish or English--neither of which he knew well enough to use.) Yet the behavior of this man, when understood and interpreted in terms of his cultural context, made perfectly good sense; his shyness, his withdrawal in a threatening environment, his inability to communicate (no one else in the hospital knew the Navajo language), all were "normal" responses when considered in the appropriate framework.

There are other features of the clinical situation in medicine that in some senses are analogous to the problem situation of the anthropologist, and these bear comment in relation to skills and method. In medical practice, the physician starts his process of interaction with the patient with what exists, with the problem that is presented to him empirically--and imperatively. There is a person who is suffering and who has sought help. That person's problem, that set of empirical facts, remains paramount in shaping and influencing the physician's subsequent behavior, both with respect to the clearer definition of the problem itself and to possible and feasible solutions.

This strong allegiance to empirical data as they present themselves and to the utilization of inductively-derived knowledge (not, of course, to the exclusion of deductive processes) also characterizes many aspects of the anthropologist's professional activities. Obviously he does not have responsibility for application of his knowledge in regard to the same kinds of pragmatic concerns that the physician does; but it can be asserted that the "presenting situation" so far as his anthropologizing is concerned shares many conceptual features in common with that of the physician in being highly "data-centered," or, at least, in making the facts of the case the loadstone by which further activities are to be guided. He seeks, and tries to foster, serendipity. There is in anthropology, in other words, far less of an initial pre-selection of data appropriate to the study of a given problem and far less opportunity for actual experimental manipulation of data than is true of the other behavioral sciences (e.g., experimental psychology, small-group behavior studies, etc.). The anthropologist--to oversimplify in order to make the main thrust of the point--takes his data where they present themselves and begins the process of inquiry at that point; the archeologist, for example, not very often being able to predict where or what he will find, but, having established a site and done analysis, then more accurately narrowing the range of possible alternatives so far as subsequent finds may be concerned. One way of characterizing the anthropological "style" of inquiry is that of "painstaking induction guided by working hypotheses," much akin to the approach of the epidemiologist. In short, in anthropology as in medicine, in the process of problem solving the empirical context of that problem, the problem in its full, real-life situation, remains on center-stage, with theoretical formulations in and of themselves serving as spear-carriers, much more than is the case in many areas of the other behavioral sciences. By virtue of such an orientation, anthropology (at least some sections) has often been dubbed as "non-theoretical" and "data-bound"; a rather more accurate way of putting the matter would be that it uses its theory flexibly, being guided in such use by the dictates of the problem at hand.

Another point follows from the preceding one. Anthropological data concerned with a given problem area, being usually not amenable to experimental pre-defining and selection are therefore often of a heterogeneous character--"bits and pieces." But bits and pieces of a more dynamic whole. The anthropologist's task, therefore, is to infer pattern and structure from such an assemblage of data, data which often approach the problem area from different points of entry, diverse data which "triangulate" upon the issues at hand. The analyst's skill, therefore, lies in his being able to extract from different kinds of usually incomplete data the regularities, the configurations, the pattern coherencies that exist, many of which he may not have even envisioned at the beginning of his inquiry. The field of linguistics perhaps provides the best prototype for such "pattern analysis," and in anthropology this kind of analytic interest and problem has been well stated by, for example, Sapir, Kroeber, and more recently Kluckhohn, who incisively illustrated the process of bringing order--i.e., patterning--out of data from different levels of analysis and of different orders of completeness.

Information

Of the world of anthropological facts there is no end--man's origin and evolution, his racial differentiation, cultural variation, his susceptibility to group pressure and influence, the dynamics of his social structures, etc. But those facts related to health and disease behavior that are relevant to the medical practitioner are a sub-set of that larger universe. Those that follow here are merely examples from a range. They would include, for example, such topics as folk medicine, indigenous beliefs about diagnosis and treatment, native schemes of classification of disease (including concepts of "normality"), studies in medical ecology and epidemiology, as well as interrelations among evolution, culture, and disease.

An example of the latter kind of problem is genetically-based disorders or disease-susceptibilities rooted in man's biological development that, by reason of particular evolutionary situations, affect modern human groups differentially. A now notorious example is sickle-cell anemia mentioned previously, a disorder found in approximately one out of every 400-500 American blacks; there is considerable evidence linking persistence of this mutation to the survival advantages with respect to malaria it conferred on those having it, the malaria itself being associated with the development of agriculture in

Africa (Livingstone, 1958).

Another example is adult lactose intolerance, for a time assumed to be a matter of psychosomatics but now hypothesized by some to be based on genetic deficiency and derivative from particular cultural evolutionary features related to the domestication of milk animals (see Simoons, 1969; Hunter, 1971; McCracken, 1971). Racial groups differ in intolerance levels--Africans and Orientals, for example, showing levels of up to 90%, while Caucasoids manifest only 10-15% intolerance--and such differences are associated, at least, with differential length of time the given population has been exposed to use of milk in the diet. Similar associations, those of a sociocultural nature, are implied in differential epidemiological rates for cancer at various sites (Quisenberry 1960; Graham 1960), and some other physical or genetic features, such as body type. Damon (1969) has summarized numerous studies that relate to the question of differential ethnic and racial associations with disease based upon genetic and possibly genetic factors:

Racial and Ethnic Disease: Simply Inherited Disorders*

Ethnic Group	Relatively High Frequency	Relatively Low Frequency
Ashkenazic Jews	Abetalipoproteinemia Bloom's disease Dystonia musculorum deformans Factor XI (PTA) deficiency Familial dysautonomia Gaucher's disease Niemann-Pick disease Pentosuria Spongy degeneration of brain Stub thumbs Tay-Sachs disease	Phenylketonuria
Mediterranean peoples (Greeks, Italians, Sephardic Jews)	Familial Mediterranean fever G-6-PD deficiency, Mediterranean type Thalassemia (mainly β)	Cystic fibrosis

Ethnic Group	Relatively High Frequency	Relatively Low Frequency
Africans	G-6-PD deficiency, African type Hemoglobinopathies, esp. Hb S, Hb C, a and β thal, persistent Hb F	Cystic fibrosis Hemophilia Phenylketonuria Wilson's disease
Japanese (Koreans)	Acatalasia Dyschromatosis universalis hereditaria Oguchi's disease	
Chinese	a thalassemia G-6-PD deficiency, Chinese type	
Armenians	Familial Mediterranean fever	

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*Data from McKusick, 1967. For references on individual conditions, see McKusick, 1966.

RACIAL AND ETHNIC DISEASE: MULTIFACTORIAL DISORDERS WITH A COMPLEX OR UNPROVED GENETIC COMPONENT*

Ethnic Group	High Frequency	Relatively Low Frequency
Ashkenazic Jews	Buerger's disease Diabetes mellitus Hypercholesterolemia Hyperuricemia Kaposi's sarcoma Leukemia Pemphigus vulgaris Polycythemia vera Ulcerative colitis and regional enteritis	Alcoholism Cervical cancer Pyloric stenosis Tuberculosis
Sephardic Jews	Cystic disease of lung	
Northern Europeans	Pernicious anemia	
Irish	Major CNS malformations (anencephaly, encephalocele)	
Chinese	Nasopharyngeal cancer Trophoblastic disease	Chronic lymphatic leukem Prostatic cancer
Japanese	Cerbrovascular accidents Cleft lip-palate Gastric cancer Trophoblastic disease	Acne vulgaris Breast cancer Chronic lymphatic leukem Congenital hip disease Otosclerosis Prostatic cancer
Filipinos (U.S. only)	Hyperuricemia	
Polynesians (Hawaiians)	Clubfoot Coronary heart disease Diabetes mellitus	
Africans	Ainhum Cervical cancer Esophageal cancer Hypertension Polydactyly Prehelical fissure Sarcoidosis Systemic lupus erythematosus Tuberculosis Uterine fibroids	Arteriosclerosis Congenital hip disease Gallstones Major CNS malformations (anencephaly, encephalocele) Multiple sclerosis Osteoporosis and fractur of hip and spine Otosclerosis Pediculosis capitis Polycythemia vera Psoriasis Pyloric stenosis Skin cancer

Ethnic Group	High Frequency	Relatively Low Frequency
American Indian	Congenital dislocation of hip Gallbladder disease Rheumatoid arthritis Tuberculosis	Duodenal ulcer
Icelanders	Glaucoma	
Eskimos	Otitis, deafness Salivary gland tumors	

*Enlarged from Damon, 1962, and McKusick, 1967.

His comments on the data are succinct with respect to the question of "relevance for medical practice?":

> What use can we make of the clear associations between racial or ethnic group and disease presented so far? The practical scientist can, as mentioned, apply them immediately to the detection, diagnosis, and treatment of disease. A given expenditure of resources will find, cure, and prevent more cervical cancer, syphilis, and tuberculosis among Nonwhites in the United States than among Whites, for example. In clinical medicine, fever, abdominal pain, and leucocytosis may have different implications in a Northern European (a "surgical" condition like appendicitis or cholecystitis), a Mediterranean (favism, glucose-6-phosphate dehydrogenase deficiency, or familial Mediterranean fever), and a Negro (possible sickling crisis). In the two last cases, the patient may be spared needless surgical exploration if the physician is aware of the ethnic and racial associations of disease. (1969, p. 174)

Aside from genetics and disease, another area where applied physical anthropological concerns might have considerable to say to the practicing physician (as well as increase his knowledge and insight into preventive medicine) is biomechanics. An example is the common "bad back" problem. Physical anthropologists have given considerable study to problems of the physics of the human body, the structural strains built into the body by evolutionary developments (such as assumption of an erect posture). Such knowledge as variations in body form and size in a given population has considerable implications for health when it comes to such matters as equipment design -- whether for safety or comfort (as exemplified, for instance, in the design of space capsules). Given ranges of variability in the structure and capabilities of the human body, there exists a fertile field for investigations having implications both basic and applied for medical practice, a field to which anthropometry and other branches of applied physical anthropology address themselves (see, for example, _The Human Body in Equipment Design_, by Damon, Soutdt, and McFarland, 1966).

Cultural facts are rich with implications for the differential perception and meaning of pain (cf. Zborowski, 1970) and disease itself -- including such basic matters as just what constitutes a disease and what is considered "normal" (cf. Paul, 1955; Saunders, 1954; Simmons and Wolf, 1954). The implications of this for diagnosis, patient care, and preventive medicine are clear -- if the physician is not given the chance to intervene in a disease process until too late because that process has not been _defined_ by the people concerned as a condition appropriate for him to see; or if, by his verbal questioning he elicits and then misinterprets an answer because of differing vocabulary or differing belief framework, then these data from the domain of human behavior become coequal in importance with laboratory findings in the total problem of diagnosis and management.

Cassell cites a good example of the influence of "folk" beliefs about illness, an example which, while taken from a contrasting cultural setting, is probably not as radically different as we might think when the intra-U.S. sub-cultural differences are looked at in depth. Among the Zulu it is a tenet of the cultural belief system of South Africa that only sorcerers and witches have the ability to transmit disease, particularly diseases that show themselves in symptoms normally associated with pulmonary tuberculosis. Against the background of this belief, then, counterpose modern medicine with its theoretic structures of the transmission and role of the tubercle bacillus. In the South African case considerable progress was being made in a program of community medicine and tuberculosis control until a physician inadvertently ran afoul of this belief -- he tried to introduce the medical concept of contagion in tracing the course of tuberculosis through a family, showing how one person had been the original source of the disease in the group and had therefore been the agent responsible for sickness in all others. In his mind he was, of course, illustrating a scientific principle; to the family, however, he was in effect accusing one of their members who originally had had the tuberculosis of being a witch through causing the sickness in the others. The physician could regain the cooperation of the family in working on health problems only by retracting his proposed explanation for the transmission of the sickness.

Another example relating to folk conceptions of disease that has highly pragmatic implications for patient management of some groups in the U.S. is the "hot-cold" theory of disease causation and cure, held widely in Latin America and other places culturally influenced by Spanish colonization. It also illustrates the general point that the patients may well interpret and define both illness and its remedies in a different framework from that of the physician. Do only non-western "folk" have "folk medical" beliefs? Quite aside, for example, from specific sub-cultures such as Puerto Ricans, Chicanos, or Blacks, there is the great bulk of the population that may exhibit "ethnomedical" or contemporary "folk medical" notions about the structure and processes of the body and remedies to cure disease gotten from the simplified diagrams of television advertising. (Do nasal sprays or stomach coatings really work as illustrated? And how persuasive in establishing a negative self-image is the dinned-in phrase about the "heartbreak of psoriasis"?)

In any case, among the Puerto Ricans diseases are characterized as either "hot" or "cold," depending on the specific symptoms. Herbs, medicines, and foods are likewise classified in terms of this scheme, a scheme that depends not upon thermal conditions but rather "hot" and "cold" in largely a metaphorical or mystical sense (for example, because of its alcoholic content cold beer is a "hot" food).

The following table from a study of Puerto Ricans in New York City (Harwood, 1971, p. 1155) gives examples of illnesses, foods, and medicines which are categorized in terms of this system (illnesses, being dichotomized into "hot" and "cold," while foods and medicines are trichotomized, the third category being "cool"). "Hot" diseases are to be treated with "cold" foods, and vice-versa, and for a patient who firmly holds this indigenous theory of disease dynamics it will do no good to prescribe a diet that contradicts those beliefs -- to prescribe, for example, orange juice or other "cold" foods as an element of treatment for the common cold (which is classified as a "cold" disease). In the following table is illustrated the classification of disease conditions and types of food and medicine into three categories, "hot," "cold," and "cool."

THE HOT-COLD CLASSIFICATION AMONG PUERTO RICANS

	FRIO (cold)	FRESCO (cool)	CALIENTE (hot)
illnesses or bodily conditions	Arthritis Colds Frialdad del estomago* Menstrual period Pain in the joints Pasmo*		Constipation Diarrhea Rashes Tenesmus (pujo) Ulcer Ulcer
Medicines and Herbs		Bicarbonate of Soda Linden flowers (flor de manito) Mastic bark (almacigo) $MgCO_3$ (magnesia boba) Milk of Magnesia Nightshade (yerba mora) Orange-flower water (agua de azahar) Sage	Anise Aspirin Castor oil Cinnamon Cod liver oil Fo tablets Penicillin Rue (ruda) Vitamins
Foods	Avocado Bananas Coconut Lima beans Sugar cane White beans	Barley water Bottled milk Chicken Fruits Honey Raisins Salt-cod (bacalao) Watercress	Alcoholic Beverages Chili peppers Chocolate Coffee Corn meal Evaporated milk Garlic Kidney beans Onions Peas Tobacco

The following table shows some of the probable patient behavior vis-a-vis certain disease conditions, behavior that, regardless of how the physician diagnoses and prescribes, is likely to occur as the patient's way of responding to the disease in the physician-free atmosphere of the home.

EXPECTABLE BEHAVIOR OF PATIENTS WHO ADHERE TO THE HOT-COLD THEORY

Patient's Conditions	Expectable Behavior
Common cold, arthritis, joint pains	Patient will not take cold-classified foods or medications, but will accept those classed as hot
Diarrhea, rash, ulcers	Patient will not take hot-classified medications and will use cool substances as therapy
Requires a diuretic as part of a treatment regimen and has been told to supplement his potassium intake by eating bananas, oranges, raisins, or dried fruit	Patient will not eat these cold classified foods while has a cold -- or other cold-classified condition (for female patients this includes the menses)
Requires penicillin or any other hot medication, particularly on an ongoing basis	Patient will stop taking hot medicine when he suffers any hot-classified symptom (e.g., diarrhea, constipation, rash)
Infant requires formula, which contains hot-classified evaporated milk	Mother will put baby on cold-classified whole milk or will, after feeding formula, "refresh" the baby's stomach with various cool substances, some of which are diuretic
Pregnant	Avoids hot medicine and hot foods and takes cool medicine frequently
Postpartum and during menstruation	Avoids cool foods and medicines, particularly those which are acidic

Harwood's further discussion of how to translate elements of this belief system into medically-sound (or, at least, medically-neutral or medically-harmless) behavior patterns on the part of the patient is highly relevant. He provides, for example, discussion of this belief system as related to general medical care, use of diuretics, the prophylactic use of penicillin, pediatric care, oral medication for children, childhood diseases, and obstetric and gynecologic care.

Perspective

A discipline may also contribute to a curriculum by engendering a new perspective, a new way of looking at things, both old, familiar things and new things brought into awareness by application of that new framework. If one part of the process of education is accumulation of "facts" or mastery of a craftsman's technique, then the other part, perhaps the most important in the long-run, is the acquiring of conceptual frameworks along the way which organize and give a wider range of meaning to those "facts." In the ideal case, of course, one may even characterize the course of a true "education" as the acquisition of ever more inclusive and comprehensive frames of reference; as a process of integration, not merely an accumulation, of data.

It is in this area of contribution to a curriculum that anthropology can also have considerable impact in medical education. If we look for a moment at the behavioral sciences as a whole and note that one of their chief contributions to medical education is through providing some level of understanding of the structure and dynamics of human behavior, then anthropology's contribution to this combined effort becomes critical. Take the central concept of the discipline, for example, culture. One of the chief points to be made in connection with beginning to grasp the concept -- a point initiated in introductory courses that usually takes several years to mature -- is how pervasive and profound is the cultural shaping of behavior. This is not to say, of course, that "culture" is an all-purpose explanatory concept. But it is to assert that, whatever may be the biological and genetic mainsprings of behavior, and whatever form our idiosyncratic experiences may shape these into, there remains a long-lasting cultural stamp on the way that behavior turns out, a cultural stamp or programming that is derived from specific, shared social experience. We are hard put, literally, to specify very many areas of human behavior that are not heavily influenced in their form and process by particular cultural formats that shape the expression, timing, sequencing, and situation of that behavior -- in short, that transmute primate behavior into "human" behavior. Speech is of course the most obvious cultural mechanism, speech and the ideas to which words refer. But the reach of cultural shaping extends throughout the realm of motor habits (how, and what, to eat; to dress and adorn the body; to defecate and urinate "properly"; to mate; to express emotions; to react to pain, etc.); of social relations (how to act "properly" with respect to the many different kinds of other human beings encountered throughout life); and to the higher reaches of human conception, in such things as values, beliefs, and orientations about the self, other human beings, and the nature of the cosmos. As Clyde Kluckhohn (1954, pp. 960-961) once said:

> The simple biological analogy of "organism and environment" is inadequate because man is a culture-bearing animal. Some sort of three-way paradigm is necessary since we have: (a) individuals, (b) the situations in which they find themselves, and (c) the modes or ways in

> which they are oriented to these situations. In terms of the intellectual division of labor which has generally been adhered to during this century, the study of individual organisms and their motivations has been the province of psychology and biology. Insofar as sociology has had a distinct conceptual field, it has been that of investigation of the situation. Cultural anthropology has been dealing with the modes of orientation to the situation. How the individual is oriented to his situation is, in the concrete sense, "within" the actor, but not in the analytic sense, for modal orientations cannot, by definition, be derived from observing and questioning a single individual -- they are culture.

If anthropology, then, has a contribution to make to a student's understanding of the dynamics and structure of human behavior, especially in the area of inculcating an understanding of the large extent to which that "human" behavior is "culturally-constituted" behavior, the question follows: what relevance has this to the medical student?

The answer hinges on the function of conceptual frames of reference in any field of study: they organize data, they provide new insights into possible relationships that are not suggested in an array of data not organized by a conceptual scheme, they allow for predictive and probabilistic anticipation of events. They provide, in short, the base for inquiry and the framework into which findings will be integrated into the conceptual anchorage to which data will be related. If, for example, the medical student leaves his period of training maintaining a focus on a "disease process" and is unable to enlarge his conceptual framework so as to place that disease process in a larger context of the "patient" as a psychobiological system, or even the person interacting in a larger sociocultural field, he may well miss some of the most important dynamics that relate to his own chosen goals, such as those of health care. Unless he is aware, for example, of class- or ethnic-group based differences in patient perceptions of and responses to the physician in the clinic-defined role setting, he may well be surprised (but should not be) when the patient fails to follow medication orders at home or take preventive measures.

Another kind of comment relating to conceptual frame of reference and implied by the above point also has direct bearing on the activities on the physician himself -- upon his own professional socialization. It can be put very simply: viz., to the extent that the physician (and it begins in his student years) sees his professional role as the treater of disease, rather than the maintainer of health for a patient or a population, then his actions will be the more circumscribed and narrowly-focussed. What this implies, of course, is that the more comprehensive conception of the role of the physician is that of a professional concerned with the health of the public; and in this larger conception of the corporate character of medicine treating of the sick will comprise a sub-set of the total range of tasks. But that paradigm is the reverse of what holds now in medical education; and perhaps one of the chief contributions of the behavioral sciences as a whole in medical education will be that of helping change (through enlarging) that frame of reference which defines and legitimizes what are called relevant professional activities. This, indeed, might be the most lasting and important of the contributions the behavioral sciences (with anthropology as a constituent member) could make to medical education; for in the end it must be recognized that our contributions in skills (be they interviewing or analytic) and in information and data are ancillary to the principal activity, which is the delivery of service -- the responsibility of the medical professional. They can only modify, not replace, that professional activity. But when it comes to conveying an understanding of the structure and dynamics of human behavior, of community organization and social systems generally, of belief and value systems, this is an area of unique contribution of the behavioral sciences; and if a working frame of reference, a first approximation, incorporating adequate knowledge of these matters becomes part of the conceptual apparatus of the medical student, he will be in a better position to apply his own technical skills more effectively and efficaciously when it comes to extending his goals of maintaining the health of the public. Indeed, one might hope that, once the problem is defined more relevantly in broader "public health" terms, many indicated activities will flow from within the structure of medicine itself; an example that can be adduced here is the work of Geiger and associates in treating disease in a rural county in Mississippi, where a wider scope of health-related issues and required activities (such as nutrition improvement) fell logically into place once the defining framework was enlarged.

There is danger, however, in stressing the point that one of the chief contributions of the behavioral sciences is in the enlargement of a perspective, a frame of reference. To emphasize the imparting of a perspective rather than the inculcating of specific concepts and skills is almost to assert that what we are, in fact, doing is engaging in what is often called (usually disparagingly) in American universities, "general education." Perhaps it is unrealistic to expect much more at this point, with curricula filled as they are and many students' motivations being (in the narrowest sense) "medical" as they are. But the question must be raised: is it realistic to expect much more until and unless there is a broadening of the so-called "clinical model" in such a radical manner that it is able to transcend students' parochial entry goals of wanting to be "physicians" as they have envisioned the role, of wanting to "help people" as perhaps the most dominant single announced motivation for entering medical school (and, heaven knows, the popular culture reinforces the view that one doesn't need training to "help" people!) It is at least a sobering caution that until the institutionalized practice of medicine is conceived more broadly and intercepts the disease arc earlier in the minds of students, perhaps there may be little relevance of the behavioral sciences other than as sometimes interesting but nonetheless side-trips away from the priest-healer ego-ideal that seems to be the conceptual Procrustean bed of the typical medical student.

If that is the case -- that as behavioral scientists in medical settings we may be much more practitioners of a kind of general education and much less purveyors of specialized bodies of knowledge we think highly relevant to medical practice dealing with hospital structure, the "patient role," ethnomedicine, social psychiatry, and so on -- then we can see another reason for some of the role conflicts frequently cited in discussions of behavioral science in medical education. For in a sense it makes of the behavioral scientist something of an "applied" behavioral scientist -- one faced with the task of adapting wide bodies of knowledge in such a way as to innovate new behavior patterns, to create, as it were, social and culture change of a sweeping nature. Certainly, for the field of anthropology at any rate, those who have worked in an "applied" situation have traditionally felt the disparagement of such activities -- perhaps one of the reasons we find so few anthropologists involved in the behavioral science programs of the medical schools.

And yet let us look again at this process and its relation to medical education. A great deal is written in anthropology on the subject of introduction of changes in thought or behavioral habit among people different from us. The general rubric is "induced sociocultural change." Without stretching the point too far, one may draw a parallel between such programs of deliberate innovation in non-western societies, and the attempt to introduce new concepts (and ways of behaving) to medical students. In each case, so far as anthropology is concerned, it is more fundamentally an exercise in centrifugal anthropology than one in what may be called centripetal or "self-centered anthropology," i.e., anthropology which looks only to those goals dictated by the purposes of the discipline itself, and not to questions thought to come from some other findings coming from studies of the introduction of technological or ideational change is that the proposed innovation must articulate with a "felt need" of the group concerned; it must initially in some way touch what the clients are interested in, no matter how far afield from that initial point of entry it may eventually carry the group.

In this light, it seems understandable why any behavioral science that does not seem related to the clinical enterprise is often not very enthusiastically accepted by medical students. Their "felt needs" clearly are related to those of the "doctoring skills" -- of helping people, alleviating pain, solving problems of distress, and so on. Thus it is that a health-related issue on which the behavioral sciences have a great deal to say in the abstract (such as, for example, air pollution) may not conform to what the medical students hold to as the relevant frame of reference, no matter how logically its relationship to the clinical issue may be argued. What this implies, of course, is that perhaps the technique of choice for the introduction of behavioral science knowledge and skills into the medical curriculum is an inexorable and pervasive extension of the "clinical model," rather than the construction of competing but non-articulated tracks of basic science.

Some years ago Clyde Kluckhohn and Henry Murray, two major figures in the movement toward integration in the behavioral sciences, noted that:

> Every man is in certain respects
>
> a. like all other men
>
> b. like some other men
>
> c. like no other man

Their purpose was to illustrate the multiple influences that shape human behavior (and hence, the multiple approaches to understanding it that are required). Another function of the paradigm, however, is an integrative one, for it provides a semantic structure against which any given discipline (or, in reality, any given problem from that wide range of problems studied in the given discipline) can be placed vis-a-vis each other in terms of levels of abstraction employed. Hence the areas of articulation and overlap can be seen.

In the present context the paradigm can be made to serve an even larger purpose of integration; for it is with reference to some such paradigm that the dialectic of medical practice goes on, in a manner that is similar conceptually to what goes on in the behavioral sciences.

Taking anthropology as an example, this field's concern with evolution, with cross-cultural comparisons, and with man as a species speaks to the first proposition. The physician's attention to the "normal" curve as the basis for clinical judgment is, at least in intent, congruent with a species-wide generalization(although it must be allowed that often such distributions are based upon parochial samples). Anthropology is likewise concerned with delineating those features of human behavior in which, at a lower level of abstraction, differences exist among men and groups of men. Much of the literature on cultural diversity, for instance, is relevant to this second proposition. Similarly, the physician, having established a departure from the "normal" in a given patient, then turns his attention to those features of the disease process, their implications for care and for the personal life of the patient, which now separate him from other, in this case, "normal," men. He becomes part of a class that is less than the whole.

Finally, regarding the last proposition, a theme in anthropology complementary to the level of grouping cultures and societies into types, is the interest in the unique, the idiosyncratic; perhaps the most dramatic way this is expressed is in the idea of "cultural relativity," in which the specific context of any given cultural trait, the particular pattern of which it is a part, must be understood for grasping the dynamics of the whole. Such an orientation is highly congruent with the approach of the practicing physician, who in his diagnosis, treatment, and continuing care must not only take account of the universal and proximal features of the patient's biopyschological system, but in the end give attention also to the specific genetic, biochemical, and phenomenological domains of the universe that is the single patient. It is, perhaps, pre-eminently in regard to this third proposition that the "art" of the 'art and science of clinical medicine' becomes apparent.

We have looked briefly at anthropology as a discipline, at the kinds of problem areas it is concerned with and the type of assumptions it makes as to what is important to study. We have also cursorily discussed some of the implications which that discipline, so characterized, might have for medical education through contributing skills, information, or an enlargement of the student's orientation and frame of reference. We concluded that there are several ways in which anthropology as a discipline can usefully participate in medical education, along with the other behavioral sciences.

But to what extent does it actually so participate? Let us look at the nine case studies that were undertaken in connection with this project and see whether and in what ways anthropology as a discipline is found in the behavioral science in medical education programs at Connecticut, Duke, Harvard, Kentucky, Michigan State, Missouri, Pennsylvania State, Stanford, and Toronto.

The most generous initial assessment of the situation is that, in general, anthropology as a discipline is notable by its formal absence. There are very few anthropologists working in the behavioral science programs or departments in the several schools -- in fact, in only four are there any listed as members of the core group of behavioral scientists (Stanford, Kentucky, Michigan State, and Connecticut), and at only one other place are any listed as available for elective courses (Duke). But all in all, the total number of anthropologists involved as basic members of the programs is less than 10 -- in other words, an average, at best, of about one per program. Clearly, on the basis of numbers, the voice of the anthropologist is not heard very loudly in the land of medical education.

But there are ways a discipline can have influence beyond the simple reckoning of number of bodies, which is only one indicator. There are others of the three "C's" (corpus, course, concept) we should also look at regarding types of contributions.

We are not, however, much better off in assessing anthropological contributions if we limit the purview to "courses" that are "clearly anthropological." Again, perhaps by virtue of sheer number of bodies, but also by virtue of the special kind of amalgam of behavioral science courses in medical education that characterizes much of this process, there are very few, if any, courses that are "anthropological" in the disciplinary sense of the term. The program at Stanford is outstanding in this respect, giving the student the option of pursuing the M.A. in anthropology as part of his total medical training.

Other courses taught in a number of places, however, begin to touch on anthropological areas of interest, concept, and data; and it is in this way that the third possibility for anthropology making a significant contribution to the behavioral science dimension in medical education is most pronounced -- the area of concept, together with associated data. When one surveys the range of courses taught, a number of key terms stand out repeatedly -- "social influences...," "cultural dimensions...," "attitudes toward...," "meaning of...," "ecological factors in...," "organization of...," etc. It is not our purpose here to resurrect tribalistic territorial disputes, but simply to make the assertion that a great deal of anthropological literature based upon both research findings and conceptualizations has found its way into the common culture of medical sociology and medical social psychology. The term "culture" is perhaps the clearest index of this; for sociology as a discipline, the term is a much used -- but ancillary -- one in the characterization of group life and social organization. While its historical formulation and development in the behavioral sciences clearly lay in the emerging discipline of anthropology rather than sociology, in the current scene it is one of the common and shared kinds of concepts among the behavioral science disciplines, often used whenever the dimension of shared belief, orientation, "meaning" is being discussed. And there are numerous other "common" concepts.

The point is that there is a certain measure of fluidity in the concepts and data employed as teaching aids in the field of behavioral science in medical education -- if a particular reading is useful for the point being made, in many cases not too much concern is given to its disciplinary pedigree. And that is the way it should be. All things are relative, taking their final form as a function of context and perspective. This is true even of academic departments and the purportedly absolutistic, bounded, unreducible domains of knowledge ("disciplines") they represent. For example, are the much-used works by anthropologist Zborowski (on cultural perceptions of pain and the pain response), by Paul (on cultural and social factors in health program innovation), by Caudill (on the psychiatric hospital as a small society) shunned by non-anthropologists teaching behavioral science in medical education? Not likely, to judge from the extent to which they are now (and have been) used. And this process of "cultural diffusion" (to use an anthropological phrase) with respect to data and concepts that goes on in current teaching programs is perhaps a harbinger of the kind of incipient "behavioral science" that, perforce, could emerge from the discrete contributions to medical education of the basic behavioral science disciplines of anthropology, sociology, and psychology. If such a working unity does emerge from this arena of joint purpose, it will represent one way in which the behavioral sciences might be in this instance the recipients, and not just donors, in their participation in medical education.

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A VIEW FROM PSYCHOLOGY

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A VIEW FROM PSYCHOLOGY

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> The dishwasher in the kitchen broke down. The lady of the house, after a casual inspection of the problem, thought she could fix it. However, she decided against this course of action. Perhaps an expert would be best after all. She called the local plumber but he botched the job. In a fury, the lady cried, "My God, all it required was some common sense." The plumber retorted with some feeling, "Madam, common sense is a gift of God. I have only a technical education."

PART I

Behavioral Sciences in Medical Education

The origins of medicine are lost in pre-history. As best we can guess, the field probably derives from Man's propensity for magic as a problem solving device. When medicine's exploits began to be recorded, it became clear from these chronicles that the magical ingredient which "cured" many diseases was to be discovered in an interpersonal chemistry that, to use what has become a modern day cliché, is identified as the doctor-patient relationship. Much human suffering seems to dissolve when these ingredients are properly mixed.

Medicine depended for much of its therapeutic success on promoting the process of this relationship. The physician's major therapeutic tools were his capacity to influence the patient's malaise through authority, understanding, persuasion and other psychological techniques. For the other cures, the doctor relied on hope and the mysterious ways of nature.

The major breakthrough in the assault on disease and death came in the nineteenth century, the so-called Golden Age of Medicine. This was, in its most important aspects, a technical revolution. The tools which would alter biological processes were foretold in the great discoveries of the period. The technical revolution which began in the nineteenth century continues unabated in the second half of the twentieth. New tools are being fashioned that promise to bring about quite startling alterations in the human condition which, even a short time ago, only science fiction writers dared to contemplate. Witness the recent breakthrough in the unraveling of the genetic code and the isolation of a single gene. Using the nineteenth century as a baseline, the knowledge explosion in medicine and the technological implementation which followed can be described as a rapidly accelerating curve moving toward a limitless horizon.

The rapid advances have produced some disturbing "fall-out". Since the end of World War II, some segments of the medical community abetted by the increasingly influential sciences of human behavior, vigorously inveighed against what they considered the rapid decline in the human side of medicine. The complaint, briefly stated, was that the technical revolution had created an array of tools with which to do things to people and this resulted in less and less time to do things with people. The atmosphere was becoming increasingly impersonal and the physician was placing the person in the role of "patient as object". In essence, this concept is characterized by a form of communication in which the patient is identified by the disease rather than by his human qualities. This attitude is characterized (perhaps caricatured) in a play about physicians produced in the 1930s. One intern reminds his associate that "You'll have to check the gallbladder in 321." (1)

It illustrates the tendency to separate the disease from the individual experiencing it. This segregated view, self versus body, became something of a battleground for medical educators during the last twenty years. The new view one heard expressed with increasing frequency might be summed up in the slogan, "patient as person". This concept has been moving into the ascendency in recent years, perhaps best reflected in attempts to develop patient-centered curricula, the object to reunite technical medicine with human medicine.[1]

The "radicals" charged that medical schools had, in fact, deteriorated into trade schools. Whatever the merits of the charge, a hostile, denigrating meaning was intended. After all, no one wants his profession to be designated as a trade and teachers of these professions didn't like the idea that they were training tradesmen. Historically, at least, being "in trade" became an acceptable way of making a living but it certainly wasn't a ticket to social acceptability in the upper classes.

It is not altogether clear what was meant by a "trade school" when applied to a professional training institution such as medicine. Trade schools generally are thought of as places where technical skills such as auto mechanics or typewriter repair are taught. It is not a school that is concerned with ideas, theories, research, scholarship, human feelings, and the complexities of the physical and social environment. Within the context of this charge, then, medical schools were seen as not concerned with these matters since their only objectives was to turn out skilled technicians.

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[1] The author once suggested that these curricula be described as person-centered rather than patient-centered since medicine's interest in people went much beyond the rather time limited slot occupied by individuals identified as patients.

However, the epithet "trade school" has been used very imprecisely and perhaps even irresponsibly. The medical school has always been concerned with ideas, theory building, research and scholarship but the emphasis has been clearly and almost exclusively on the physical dimensions of the organism. What has been absent, at least until recent times, is the medical school as an important intellectual center for ideas and research regarding psycho-social matters as they affect health and disease. Perhaps it might be more correct to say that it has only been in recent years that the study of behavior has begun to approach in interest and status some of the more traditional concerns of the medical school.

The "trade school" accusation seemed to revolve around what some educators felt was medicine's failure to alert future physicians to the problems of people as patients. In addition, this group felt that students were taught to do a job but no one took the time to teach them how to think critically about the tasks in which they were engaged. It was the often expressed hope that the addition of psychiatry and the behavioral sciences to the curriculum would go far to correct these defects. The dissatisfaction with this aspect of education should be diminishing since departments of psychiatry have had a phenomenal growth. In recent years the increasing participation of behavioral scientists in the teaching task has also been notable. What we do not know is the effects these efforts have had on the products that schools of medicine have turned out. Are they producing physicians who can effectively use behavioral knowledge and methods in more effective patient management?

The study of human behavior entered medical education through the discipline of psychiatry. Its beginnings were minuscule but its rise to prominence has been impressive. This achievement was not obtained without a considerable struggle. From its inception, psychiatry has met with downright hostility, amusement or indifference from the academic community and the practicing physician. Only from a very small group of physicians did psychiatry get any sort of hearing at all. As psychiatry grew and prospered, the atmosphere became more hospitable and its audience bacame larger and more respectful. Physicians were increasingly impressed that emotional factors were in some way important. They were willing to accede to the insistence of psychiatric personnel that somewhere between fifty to ninety percent of all illness was based on a psychological etiology. They were even willing to accept the dictum that physicians should understand, evaluate and manage the emotional factors in illness. All signs pointed to the fact that psychiatry had made it into the community of medical specialities and yet - not quite.

It is reasonable to predict trouble in any community where a minority segment of the population speaks a language which is different from the rest of the group. The likelihood that the prediction will come true is increased when the minority members utilize concepts, content and methods which seem alien to the concepts, content and methods of the majority. There have been herculean efforts during the last twenty-five years to bridge the gap. Psychiatry and the behavioral sciences are now greeted with greater enthusiasm in the medical community. However, acceptance is by no means complete and the value of this discipline is still questioned in many quarters of the academic and professional community.

In my view, the reason for these reservations lies in the feeling that the sciences of human behavior have not provided an information base that can be translated into methods that have clinical applicability, that is, for the non-psychiatric physician. In short, they are asking to be provided with specific skills with which they can attack specific problems. Unless we can meet the demand for practical behavior skills for a variety of problems which are met in practice, many students and physicians will continue to be skeptical about the value of our contribution.

Curriculum development often seems to proceed without any clear idea as to its purpose. Much content is selected without any apparent thought as to the specific functions ultimately to be performed by the consumer of the knowledge. Part of the difficulty may lie in the fact that the behavioral scientist as teacher often does not have any clear idea what these future tasks are like. The problem of teaching goals was illustrated at one of an infinite series of meetings whose task was to streamline and integrate the curriculum, i.e., build bridges between basic science knowledge and clinical skills. Basic scientists (biochemists in this instance) championed the inclusion of certain kinds of material in the first year program. The representative from medicine kept shaking his head in disagreement and interjecting with "the average doc just doesn't need that...doesn't need that at all." As he seemed to see it, a curriculum dedicated to the integration of basic science knowledge and clinical practice involved sifting from available knowledge that information which had functional value for the tasks most physicians perform. From the point of view of scholars and scientists, such a task oriented position aimed at the education of the "average doc" may seem the height of anti-intellectualism. Nevertheless, behavioral scientists must come to grips with the fact that the vast majority of the students they educate will be practitioners who need tools (along with common sense) to solve a myriad of problems patients present to them on a daily basis. If we cannot provide a significant base of scientific knowledge which is usable for problem solving, our audience will (after initial bursts of enthusiasm) grow smaller, more resistive and reject our product as interesting but impractical for them. This is not a new story. Does it need to be a continuing one?

The choice of material to be taught is also dictated by the amount of time provided and the structure of the curriculum. The choices may be further dictated by the destiny that the school has set for itself, e.g., practice oriented versus research oriented. In a graduate school, relatively speaking, there is considerable time to present the necessary material. In addition, most of the methods and content taught are concerned with a single discipline to which students have elected, more or less, to commit themselves. No such luxury is provided by the medical curriculum. Time is limited and multi-disciplines vie for the students' interest and involvement. Given such limitations, the behavioral science teacher must judiciously select the material he will present. Such decisions must closely reflect the relationship of the subject matter to the instrumental behaviors the student will ultimately perform.

Behavioral science knowledge has multiplied at a very rapid clip during the past twenty years. There is much to choose from but the problem is what content is most relevant to what ends. The behavioral sciences should, it seems to me, order its methods and content with specific goals in view. For example, if the sociologist discusses models of health care delivery the goal might be to sensitize students to the complex social, governmental and economic forces which ultimately define the structural and qualitative aspects of medical practice. Such knowledge helps the student think in a more richly diversified way about medicine's role in society; makes him, hopefully, a more committed and effective citizen-physician, etc. However, its direct applicability to the process of diagnosis and treatment is difficult to specify. On the other hand, medical sociologists have made contributions which are closely tied to task oriented procedures. Leta Adler, for example, modified the Bales method and developed what she calls a Psychotherapy Interaction Scale (PIA). The PIA provides a means of illuminating the processes of the medical interview.(2) The scale derived from the methodology of sociology has highly specific value for current (i.e.,diagnostic history taking in practice). However, it must be stressed that the instrumental value content may have depends on the audience and the goals it is seeking. If, for example, a specialty track were offered to students in medical administration, then the functional value of a subject such as health care delivery services might increase dramatically.

These considerations depend on the curriculum structure that a medical school adopts. Many medical schools seem to be moving in the direction of providing a structure in which there is a major core, a specialty core (sometimes referred to as a track) and a series of electives. Major core would be defined as a subject matter which all students would be expected to learn. Specialty core would be defined as material taught to students who decided to "specialize" in certain areas of medicine such as pediatrics and psychiatry. Electives, of course, are defined in the usual sense and would be available to all students.

Three variables seem to dictate the form a behavioral science curriculum is likely to take. They are (a) allotted teaching time,

(b) structure of the medical school curriculum, and (c) goals of teaching. Given these considerations, behavioral scientists should carefully inventory their fields and in a sense apply a "conversion factor" to each of the units which comprise such a listing. In other words, subject matter which has a high potential for being translated into usable techniques and information in medical practice would rank high on a "conversion scale"; those units which had little or no relation to medical practice in terms of clinical use would rank at the bottom of the scale.

Samples of content which would rank high on such a "conversion scale" are learning theory, psychological and cultural dimensions of pain[1], psychopharmacology, communication theory, hypnosis, psychophysiological and socio-cultural aspects of anxiety, depression and related affects, neuro-psychology, systems of diagnosis, computers in diagnosis and treatment, behavioral concepts of dying and death, etc. Other subjects would rank low. For example, behavior genetics, a recent addition to the curriculum would rank low on such a scale. Many, I fear, will see this as a retrogressive suggestion but the subject does not fit easily into the above framework. If it seems important that all students should have some knowledge of this field, then a required reading list should be assembled and if the instructor were so inclined he could test them on their level of acquisition.[2] In any event, such a list is a good idea since the student is likely to learn more from books than teachers.

However, a subject which might have a high degree of convertibility may have its utilitarian value destroyed by the content chosen. For example, "growth and development" is commonly taught from a psychodynamic framework. The theoretical character of the presentation while important for preparation in psychiatry is of highly limited value as far as direct applicability to problems met within medical practice.

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[1] Curiously enough, pain is rarely taught except by neurologists. The psychological and social dimensions of pain are not only important in comprehending the phenomena but of practical value as well.

[2] Since National Boards are likely to become a reality for the behavioral sciences, some form of preparation in subjects like human development and behavior genetics would be essential.

Curriculum is the pivotal issue with which behavioral science in medical education must come to terms. While the current study of behavioral science programs explores several significant issues, its greatest value is the detailed information it provides concerning curricula. Although the curricula in these studies may not be a representative sample, they do reflect the kind of currents which is likely to be influential in shaping behavioral science teaching programs in medical schools.

Since my assignment is to focus on the role of psychology as a behavioral science in medical education, the balance of this paper will concern this discipline. However, as in the introduction, the central issue of teaching content will be its focus.

PART II

Psychology in Medical Education

Introduction

Psychology is one of the newest of the sciences to establish a beach-head in schools of medicine. Nevertheless, the human events psychology purports to study, understand and teach is medicine's most ancient subject matter.

There is no dean, professor, student or layman, past, present or future, who would not agree that doctors of medicine should be sophisticated in their ability to control human behavior. No one would dispute the view that a very significant part of good medical care is helping patients adapt to their health problems. While I infer with great confidence such unanimity of opinion, I hasten to add that this agreement only concerns the end product. There is considerable disagreement about the means by which these objectives are to be achieved. The diversity of opinion ranges from those who maintain that these skills are simply shaped by the process of living and that formal tutoring is unnecessary for their acquisition, to those who insist that a complex curriculum is required if doctors are to learn how to effectively intervene in the lives of the people they are called upon to care for.

The recent history of behavioral sciences in medical education, which, in capsule form, is illustrated by the case studies, indicates that the latter philosophy is clearly in the ascendent. In many medical schools the behavioral sciences have commandeered a respectable slice of curriculum time which provides unparalleled opportunities to shape the future of medical thought and practice. Nevertheless, the case studies tell another story. The current activities of the behavioral sciences in medical education parallel (for want of a better metaphor) the developmental stages of the young child. It has so many tasks to master and so many problems to solve that it seems to be running off at all directions at the same time. As in any developmental struggle, there are likely to be failures. There is a good deal of talk about how to master problems but there is also, I think, a good deal of uncertainty about how to proceed.

There is not much agreement as to how behavioral sciences should be taught and even less as to what should be taught. There is no unifying concept which ties behavioral science knowledge together that goes much beyond the statement that these disciplines view Man from different platforms. We confidently inform students that all of this adds up to a whole man but they seem to have difficulty in understanding how the link-up takes place. It is questionable whether our unifying concepts are much more sophisticated than that reflected in the song that goes "... and the shin bone is connected to the thigh bone...etc."

None of the above is meant to be pejorative nor is it meant to stimulate gloom. On the contrary, the behavioral sciences have been vigorously pushing forward and their organizational growth within the medical school attests to that fact. Its growth is also prima facie evidence that its relevance to patient care at the individual and community levels have been sufficiently impressive as to persuade medical administrators to provide increasing support for these programs.

Nevertheless, there are formidable problems which lie ahead such as developing a coherent body of information that we all consider essential for doctors of medicine. The case studies are a useful guide not only because they provide some idea of the "state of the art" but because they pose important questions and provide useful information concerning content, methods and objectives.

An Historical Note

Before proceeding to psychology's role in the case studies and the kinds of contributions psychology can make to a core medical curriculum, some observations concerning psychology's history in medical education may provide a useful backdrop. This picture is derived both from the formal history of the period and from the narrower perspective of my own experiences as a participant in medical education.

Although psychology is a relative newcomer to medical education, it is clearly the senior member of the behavioral sciences group in terms of years spent in teaching, research and administration as well as in the number of its members engaged in these pursuits. As early as 1912, a series of papers authored by J. B. Watson, Shepherd I. Franz, Morton Prince, and Adolf Meyer appeared in the Journal of American Medical Association urging a psychology curriculum in medical education. (3) In the ensuing years, an occasional psychologist such as David Wechsler at New York University was to be found on medical school faculties. As Matarazzo points out, this "represented a recognition of individual abilities rather than a recognition that psychology as a profession had a contribution it could make to medicine." (4) However, it was not until post World War II that psychology began to command an active, expanding and formal role within the medical school. Perhaps the appointment of David Shakow in 1946 as Professor of Psychiatry at the University of Illinois might provide the bench mark for this development. In the early fifties, psychologists such as Louis Cohen at Duke, Ivan Mensh at Washington University, Irwin Knopf at Iowa, Milton Horowitz at Western Reserve, Arthur Bachrach and Evan Pattishall at Virginia, Joseph Matarazzo at Oregon, Carney Landis at Columbia and many others assumed active roles in teaching, research, training and administration. By 1956, the movement was accelerating so rapidly that the time seemed ripe for a conference designed to assess where psychology had been and where it might be going in medical education. (5) As a further index of growth, a survey prepared for this conference revealed that 346 psychologists were employed by medical schools. In 1959, another conference was convened to consider what substantive content psychology could contribute to medical education. (6) By 1964 the number of psychologists had increased to 993 and the most recent study indicates that there are approximately 1300 psychologists on the roster of medical schools.(7) In addition, at least two psychologists, Carlyle Jacobson and John Conger attained high level leadership roles when they were appointed as deans at Syracuse and Colorado respectively. We can infer from these figures that psychology has had an impact on medical education. I think it would be altogether reasonable to state that psychology prepared the ground for the introduction and effective participation of the other behavioral sciences.

While Psychology's pioneering role was influential, it is historically unclear at what point the broader concept of behavioral sciences was grafted onto the body of medical education. It is likely that psychologists who were in medical schools during this early period made use of ideas from sociology and anthropology in teaching and research. My own recollection is that the ferment in psychiatry, which began after World War II, led to a search for new concepts and tools with which to broaden its theoretical and factual base. Psychiatry had already discovered a useful if sometimes difficult ally in psychology. Particularly because of the influence of the post-Freudian socio-cultural theorists such as Horney, Fromm, Sullivan and Kardiner, psychiatry began to form alliances with the social sciences. But increasingly influential non-psychiatric physicians within the medical school appreciated the potential contribution of the social sciences and provided financial and administrative support for them. Psychologists, as the above figures indicate, were already present in appreciable numbers. As sociologists and anthropologists entered the scene, the necessary professional ingredients were present for the collaborative effort demanded of a behavioral science program. However, a superordinating concept was needed to organize and launch the behavioral science team. As I recall, the credit for introducing such a concept to medical education belongs to Edward Stainbrook. The State University School of Medicine at Syracuse, New York was the cradle in which the concept was initially tested.

The author first heard the term "behavioral science" from Stainbrook.[1] The year was 1949. At that time, Stainbrook was assistant professor of psychiatry at Yale and a consultant to the Connecticut State Hospital where I functioned as a staff psychologist. During frequent conversations and at lectures and conferences which I attended, Stainbrook outlined his ideas, conceptual and administrative, concerning the role of behavioral sciences in medical education. Although Stainbrook's formal training was in psychology, he had a unique grasp of sociological and cross-cultural themes as they applied to health and disease. All of the essential issues we have become so familiar with over the past fifteen years were described by Stainbrook during the period 1949 - 1952. He had the opportunity to put his ideas into practice when he accepted the chairmanship of the department of psychiatry at SUNY at Syracuse. I was invited (and accepted) to join the department as the representative of psychology.

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[1] Stainbrook's preparation in several aspects in psychology was extensive. He had wide experience in clinical psychology as well as in theoretical and experimental psychology. He received a joint M.D., Ph.D. (in psychology) in 1945.

We began our teaching activities in 1952. However, in order to launch a collaborative teaching program, a sociologist and/or anthropologist at a minimum was a necessary requirement. We borrowed an anthropologist from Syracuse University. In 1953 our need for a sociologist was solved when Robert Straus, whose contribution to the behavioral sciences in medicine is too well known to need further comment here, joined the faculty as a member of the Department of Public Health. With this skeleton crew we began to limn out a behavioral science curriculum.

Stainbrook suggested when feasible that "wave front" teaching should be the method of choice. This technique is based on a conceptual point of view which he described as follows:

> "At what most medical men consider the basic level of physiological function and dysfunction, it can be shown readily that social and cultural happenings may have quite definite effects upon the facilitation and the perpetuation of physiopathology. It would seem that one effective way to represent the transactions by which culture, society, and personality enter physiology is to use the conception of open-ended, interlocking, reciprocally transacting systems. The physiological system, structured by anatoma and composed of interacting

> biochemical and electrophysiological systems, is an open-ended relationship with the personality system. The personality system, in turn, can be represented in reciprocal relationship with the various small-group and institutional systems which comprise the more complicated social environment, ranging from the single organization to the community and national polity." (8)

Transacting this in terms of the "wave front" teaching meant that a topic, for example, infancy, would be taught from several points of view and hopefully appropriate linkages between them would be established. Ideally, the lecture sequence for this topic would be initiated by a biologist (or other specialist who had expertise in this area) whose objective would be to outline the role of genetic history as both a limiting and directional process in development. A second expert, perhaps a physiologist, would provide a picture of structure and function and its implications for the development of human behavior. The next specialist at bat would be a psychologist and his task would be to discuss those events which are important to personality development. Finally, a sociologist and/or an anthropologist would accent social data designed to illuminate the effects of child-rearing practices on personality development both locally and cross-culturally. Other behavioral scientists could certainly enter the "wave front" although at Syracuse we relied only on the more traditional specialists. Such a format provides for close collaboration. An implicit hope was that the intimacy involved in this working arrangement coupled with the necessity of coming to terms with common objectives might result in a contribution to an integrated theory of human behavior. At Syracuse, we made no headway with the latter goal. Whether this pedagogical format was any more successful than the more usual arrangement is a moot point. However, in one way or another most behavioral science programs attempt to emulate this model. Since all of them are committed to the idea (in word if not always in deed) of the continuity of the biological, psychological and social systems, they seek teaching formulas which parallel this concept. How successful such an approach is in terms of integrating content as well as teachers is unclear to me. The case studies are not very illuminating on this point.

As the collaborative teaching effort evolved, an administrative unit in the behavioral sciences was established by Dean Willard. Robert Straus acted as coordinator for the group. As far as I know, this was the first time a medical school made a move toward bringing behavioral sciences together under a single administrative umbrella. Whether this arrangement would have eventually developed into a more formalized unit such as an autonomous department is a matter of speculation since several of the major participants left Syracuse for posts at other institutions. However, the events described above were probably highly influential in the decision to establish a department at Kentucky.

If Syracuse was a prologue to the development of behavioral science programs, the events at Kentucky can properly be considered the beginning of Act 1. Up until this time instruction in human behavior was almost the sole property of psychiatric practitioners. With the introduction of behavioral sciences, a new breed of professional scientist was to be added to the roster of medical schools. There was no gainsaying the fact that these scientists were necessary (if not always welcome) additions to the faculty. The struggle now centered upon the administrative format which translated meant how and by whom would behavioral scientists be controlled. In the ensuing years, several solutions have been attempted.

As the matter now stands, it is unlikely that a single administrative standard will be agreed upon.

The general history of this problem has been discussed by others. However, there are two aspects related to psychologists which might be noted here. Most psychologists in medical schools are identified as clinicians. While a clinical psychologist may be able to do many things, the usual characterization is one who is a specialist in the assessment and treatment of abnormal behavior. The emphasis is on practice rather than research although many clinicians effectively combine both roles. In addition to these functions, clinical psychologists have provided much of the instruction in the fundamentals of human behavior. As far as non-medical instructors are concerned, clinical psychologists have dominated the teaching scene at the undergraduate and graduate levels. However, developments in the behavioral sciences provided a new avenue for psychologists. Behavioral science units now began to seek psychologists with other identities, e.g., neuropsychologists, psychopharmacologists, physiological psychologists, social psychologists, etc. A more catholic view of the role of psychology was emerging.

Secondly, the historical relation of psychology to psychiatry is also of importance. Psychologists as a group have chronically complained of their subordinate (some would substitute subservient) role to psychiatrists. There has always been a strong feeling that more autonomy and greater equality were the necessary ingredients for happiness. Indeed, in some quarters the bitterness has risen to such a pitch that an exodus from medical schools is proclaimed as the only panacea for this problem, e.g., the statements of George Albee.

Fortunately, most psychologists in medical education do not take this manifesto very seriously. At least, I've heard of no mass resignation as a response to this Latter Day Moses.[1] But the wish for administrative units as well as teaching and research programs which are controlled by psychologists is still a highly attractive goal within the profession.

Mattarazzo's Department of Psychology at the University of Oregon is unique for medical schools and fits, I am sure, the "beau ideal" of many, if not most psychologists. But I also foresee that psychologists will applaud the multiplication of departments of behavioral science. They represent another step in the direction of autonomy, equality and responsibility. Support from psychology for the development of behavioral science is a certainty.

These developments will effect the numbers and the kinds of psychologists in medical schools. However, it is not likely to significantly alter the historical collaborative relationship between psychology and psychiatry. Clinical psychologists will continue to be the dominant representatives, at least in terms of numbers, in the medical school and they will continue to be largely housed in departments of psychiatry. Since their training and interests emphasize application, the identification with psychiatry's mental health mission will continue to be strong.

The Case Studies: Psychology's Role

The nine case studies are impressive documents. They describe in detail the enormous amount of effort which has been expended in trying to effect a major change in medical education and thinking. It would be necessary to have been a participant in medical education prior to 1960 to appreciate how drastically the scene has changed for the behavioral sciences. Anthropologists, psychologists, and sociologists are increasingly familiar figures in the lecture halls, seminar rooms, on ward walks, at grand rounds, on admission committees, etc.

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[1] As Witkin and others have documented, medical schools are attractive settings to work in. Material advantages such as salaries are generally better than at other institutions.

The case studies seem to provide evidence that a period of expansion lies ahead. This is based on the observation that the scientists who compiled these documents feel that, on balance, what they have to contribute to their medical schools is well accepted and is here to stay. These studies also seem to point to the conclusion that a self-contained unit whether a department or division is the most effective vehicle for achieving educational, administrative and research goals. If deans as well as other powerfully placed administrators read and accept the message in the same way, then self-contained behavioral science units will become commonplace in medical schools.

The behavioral science programs from the nine schools are characterized by their individuality. This is both a challenge and a difficulty. Since we are in a phase of exploration and growth, the challenge lies in the opportunity to study the effects of different formats as vehicles for achieving our educational goals. The difficulty lies in making clear to others (i.e., deans and other powerfully placed administrators) what we intend to provide medical students with that is useful in the care of people. Since different programs emphasize different content, administrators may question what appears to be the lack of a common pool of relevant knowledge. Their expectations have been conditioned by other disciplines where core content is fairly well agreed upon. While we need not apologize for the diversity, we should be prepared for such questions with meaningful answers.

The behavioral science programs in this study are built around a common theme. They pay homage to the point of view that Man is a multi-faceted animal who can only be fruitfully comprehended through the analysis and synthesis of biological, psychological and environmental events. While each program attempts to hold this multi-thematic banner aloft, it is a tall order to expect any curriculum to present this tripartite model in an even handed, in-depth fashion. Quite predictably some themes are given greater prominence than others. However, I have the very distinct impression that the shape a behavioral science curriculum takes is significantly determined by the special interests of the program's leadership. When sociologists are in charge, the social-cultural dimension shines through. For example, in describing the composition of the groups who planned the initial programs at Missouri and Kentucky, the absence of representation from biology and psychology is striking. Where the leadership has its roots in the biological and psychological disciplines then these issues seem to get top billing. Obviously, these factors give rise to very individualized notions as to what kinds of information and experience medical students need.

Using this idea, a rough classification of behavioral science programs in this study is possible. Stanford, Harvard, Missouri, and Kentucky would be classified in Group 1 since the socio-cultural issues seem to be the major guidelines for their curriculum. Group II includes Toronto, Michigan State and Connecticut. While socio-cultural issues tend to dominate the curriculum, psychology and to a lesser extent biology play more defined roles. Duke and Hershey are representated in Group III. Psychology and biology are more definitively and extensively represented. While the socio-cultural themes are clearly represented, they do not tend to dominate the curriculum as in Groups I and II.

The brief summaries of the nine behavioral science programs which follow are designed to highlight the role and contribution of psychology. If, from time to time, a querulous note enters, the reader is warned that these observations are made from a highly parochial and partisan platform.

Stanford

The case study is entitled "Medicine and the Behavioral Sciences at Stanford University." However, the "behavioral" refers only to sociology and anthropology. Psychology was eliminated from the program because of a paucity of students electing an M.A. degree and because of "an expansion of undergraduate training in the medical school through the Department of Psychiatry." In addition, psychology was excluded because of "the interest of federal funding agencies in training programs geared more directly to health service applications." Psychology seems to have fallen victim to the politics of federal largesse.

The assumption is that psychology is represented in the curriculum of the Department of Psychiatry. However, this report does not specify in what way psychology's contribution to the curriculum is made. There seems to be cold comfort at Stanford for psychology at least in terms of the behavioral science partnership concept.

Harvard

Harvard almost exclusively emphasizes the effects of the cultural system on medicine. Health delivery systems, urban problems, poverty, moral decision making, the structure of governmental agencies in relation to medical care and related matters are the primary targets in the first year. A series of field exercises complement the didactic aspects in order to provide a bridge between concepts and reality. In addition, there is a series entitled Social Medicine which appears a mix of the sociological, economic and psychological concerns. In the second year, eleven lectures are provided in psychopathology in the context of a standard psychoanalytic framework. The electives provide some opportunity for concentrated study in subject matter more closely related to biological and psychological processes. However, even in the elective area psychology's potential contribution in understanding human behavior is far outweighed by the emphasis on the social, cultural, political, and economic influences on the practice of medicine.

Missouri

Missouri's program seems unabashedly sociological. The chairman is a sociologist and his faculty come from closely allied disciplines, e.g., anthropology, economics, etc. Up to the present time, psychology has not been represented on the full-time faculty although a social psychologist has been employed for the coming academic year. The choice of psychologist, however, tends to highlight the strong socio-cultural mission of this unit. While other aspects of behavior are taught, the contribution comes from psychologists in the Department of Psychiatry. There are long series of lectures given by experts in many fields. There is an occasional lecture which utilizes a psychologist. Curiously enough, behavior modification, a major specialty of psychology, is presented by a social worker. While the curriculum provides diversity within a sociological framework, it does not seem to provide instruction in other behavioral science sectors. This is pointedly highlighted in the electives which have no provision for pursuing themes other than sociological ones.

Kentucky

On page 1047, Volume IV B, the components of a unifying concept of human behavior are listed, e.g., biological-structure, function, chemistry, genetics, characteristics of the organism; psychological - the personality; social; cultural and temporal. If we use their introductory course "Health and Society" as the barometer which measures the emphasis placed on the various elements of the unifying concept, then the reading for the socio-cultural dimension is high but low for the biological and psychological segments. Psychology seems to make a more specific contribution in conjoint courses, i.e., human growth and development, communication and interviewing. However, it is difficult to determine in what way psychologists represent their discipline in the teaching of these courses. The electives are essentially sociological. This heavy emphasis is relieved only by the inclusion of medical economics and statistics as electives. Despite the above mentioned unifying concept, biology and psychology seem to be the background music for the major message.

Toronto

The Toronto report makes the point that psychologists and sociologists are "unaccustomed to work together, whose teaching and research orientations often differ; in sum, whose scholarly values are on occasion incompatible." However, these conflicts as they affect the shape of the curriculum and faculty working relations are not specified. While the strong sociological influence is apparent, the attempt to focus on individual psychology is more even-handed than in the four previous reports. In addition to growth and development and interviewing, they focus on such themes as the problems of students adapting to their new roles as physicians, personal crises in medicine, etiology of obsessive-compulsive neuroses, the psychophysiology of pain and the psychology of personality. Important subjects such as learning and biology seem to be neglected in the formal curriculum. However, there are faculty members who appear to be experts in these areas at least as suggested by their research, e.g., limbic system and behavior, neural mechanisms of learning and behavior, etc. The Toronto report closes on a somewhat ambivalent note, "The program is both inter-disciplinary and inter-professional - a strength and a weakness." Neither the strength or weakness is detailed although their initial observation about the differences between psychologists and sociologists comes to mind. While Toronto has attempted to maintain balance in subject matter, do these initial and final observations imply that agreement between disciplines concerning objectives and content is often extra-ordinarily difficult to achieve?

Michigan State

One of the striking features of the Michigan State University program is that the home base of behavioral scientists is the parent department rather than the school of medicine. This arrangement always raises the haunting spectre of commitment. It is no secret that many departments of psychology are very wary of becoming involved in medically controlled organizations. Does this pose problems at Michigan State University? The behavioral science curriculum evolves out of committee deliberations. The subject matter for which psychologists have major teaching responsibility is in a series of "mini courses." Behavior modification, mental retardation and the psychological problems of the physically handicapped are choices available to medical students. What is intriguing about the content is why these areas were selected rather than many other topics of medical interest. This is not to imply that these topics are of limited or negligible value. But the thinking behind these choices is not provided. Were these choices left to the discretion of the psychologists or were they a consensus of the decision making group? Did the decision makers see these areas as the most significant contribution psychology could make to patient care? On the other hand, were these areas chosen as models which exemplified the manner in which psychological theory and research are applied to the solution of practical medical problems?

Connecticut

The psychology faculty is concentrated in the department of behavioral sciences and community health. What is unique in this arrangement is that the department is located in the school of dental medicine. As far as I am aware, this is the richest vein of full-time talent in the country administratively assigned to a dental school. How this arrangement came into being is not made clear. It is also striking that there are no psychologists in the department of psychiatry. Can it be that the University of Connecticut is attempting to avoid the aggravations which have been visited on hybrid departments? However, these administrative arrangements do not seem to hamper the teaching commitment to the school of medicine. Curriculum time is provided to teach important psychological subjects such as anxiety and stress, behavior modification techniques, cognitive development, perception and cognitive style, group process in the management of stress, illness and dying, pain, etc. Since the University of Connecticut people provided an excellent summary of their content, some assessment of what was taught is possible. The material on anxiety and stress is well organized and the major issues are clearly presented. This is true of the other content areas as well. However, from my point of view there is one significant difficulty with the material. It seems to be organized with graduate students of psychology in mind. While the content is current and relevant, the instructors seem to build too few bridges to clinical medicine.

Duke

Duke differs from the schools previously described in terms of its administrative arrangements for behavioral science and its biological and psychological emphasis. Duke was one of the first medical schools to emphasize the role of psychology in medical education. In addition, the psychology taught had firm ties to the experimental tradition. In part, this bit of history may have been important in shaping the current strong psychological and biological emphases in the curriculum. An examination of the outline of the first year course clearly underscores this fact. However, psychologists appear to play no role (except as small group leaders) in teaching any of the major segments of the course. The only non-physician who is used as an instructor for a major segment is a sociologist. This, however, may only highlight the fact that psychiatrists and psychologists are competitors for the same material. There appears to have been some unrest regarding the use of psychiatrists as teachers of basic behavioral science. This criticism is contained in the following quotation: "...that clinical psychiatrists are not appropriate in teaching basic science and furthermore that this provides the department of psychiatry (which houses the behavioral scientists) overexposure in terms of capturing the students' interest in future career involvement. The teaching criticism was offset to a certain extent by a recent ruling in the department of psychiatry that only those M.D.'s in psychiatry who also had appointments in the graduate school or behavioral science departments would be used as instructors in the third year behavioral science course." However, there is no indication how many physicians-instructors would have these credentials. The heavy accent on psychology content and instructors is in the third year elective program. Experimental design, behavior development, cognitive personality theory, intelligence and cognition, neural substrates of perception and cognition, learning theory and psychopathology, mental retardation and related topics are possible choices provided students. Both in curriculum and in faculty, the emphasis at Duke appears more bio-psychological than socio-cultural.

Pennsylvania State (Hershey)

The philosophy which appears to guide the Hershey curriculum is summed up as follows: "The type of graduate valued as an end product of the medical school has been stated as an undifferentiated physician interested in primary care." I assume from this that their objective is to produce physicians who possess basic attitudes, concepts and skills necessary to operate in one or more areas of medical practice. One can assume further that the choice of behavioral science content is predicated on this point of view. Like other programs, the basic required course is "behavioral growth and development." The course is taught by a physician and a sociologist with occasional participation of other unspecified experts. Psychologists make their major contribution to the teaching program in the first year tracks, i.e., brain-behavior mechanism, etiology of mental illness and the theories of psychotherapy. A review of the examinations of these tracks indicates that the major emphasis lies in biology and psychology. In addition, the electives for the first and second year also support the impression that the biological-behavioral themes receive the major accent. This is not meant to imply that matters of socio-cultural import are not attended to but the contrast with Harvard, Stanford and Missouri curricula is quite striking. Perhaps more than any of the other programs, the emphasis on individual patient care is stressed. At least, this focus surfaces more clearly than in the other eight studies.

The Critical Issue Revisited

The nine programs propose several solutions to integrating behavioral sciences into medical education. While there are similarities between the programs, it is their diversity which is most striking, and, in the end, most instructive.

Perhaps the diversity of approaches is due to the fact that we are a young and inexperienced group. The years of maturity still lie ahead. In addition, we may still feel uncertain about what we know or at least what we have to contribute that is significant to medical education. Perhaps we are also overly-ambitious. Placing several disciplines under one umbrella may put too much of a strain on the decision-making process. While people committed to the ideals of behavioral science subscribe to the notion that cooperation is a guiding principle for effective group action (and we would enthusiastically teach this to students), they may be discovering that gracefully relinquishing territory to achieve the goal is rather more difficult than they care to admit. The Toronto group alludes to this, and if I extrapolate from my own observations, difficulties in mutual decision-making between people who are in different fields and have different identifications often seem to be very great. Many psychologists, for example, might be sympathetic to the idea that health care delivery is an important social and political problem. However, their colleagues from the social sciences might find them less than enthusiastic about using the limited time available particularly in the first two years to teach this subject. Under these circumstances, "power politics" may be more influential than anything else in arriving at the shape of the curriculum. Aside from allegiance to the common goal of understanding the human factors in health and disease, the various disciplines have different agendas. Whose agenda - the biologist's, the psychologist's, the sociologist's, the anthropologist's, the economist's, the political scientist's, or the historian's - will receive the most sympathetic hearing? Obviously, the character of the mix in the several programs will determine the curricula and contribute to wide inter-program differences.

One need not decry diversity. As I suggested earlier, it may be an opportunity and a challenge. How different programs work and how effectively they achieve their goals should be instructive for future developments. There is, however, another critical question that needs to be posed concerning wide variability in curricula.

How do behavioral scientists approach the task of curriculum development? I have little idea what the process was in the nine case studies. The authors were not asked to detail these events and perhaps this was a major omission. But my impression is, buttressed by experience in the medical schools I have been associated with, that the question which governs the selection of content is, "What should doctors of medicine know?" This is a perfectly simple and reasonable question. There is, however, one difficulty with it. The answers which emerge are restricted by the limitations of the disciplines asking the question. A behavioral scientist may order his priorities in terms of the knowledge extant in his own field. Psychologists may have one set of priorities, sociologists another, political scientists still another and so on. Choices are then made in terms of what each specialist thinks is important from his particular field.

Perhaps what is needed is external criteria, that is, a model against which each discipline's theories and facts can be matched. If the above question were changed to "What is the doctor's job(s)", then the first task would be to clothe the model with what is basic and essential to the task at hand.

The two questions I have posed may sound like a word game. However, the distinctions may become clearer by reference to the recent history of the struggle for curriculum change in medical education as a whole. Briefly, it involves a clash between basic scientists and clinicians in which the latter claim that the former do not teach what is essential to the doctor's job. In other instances, the accusation is that what they teach is irrelevant to the effective education of good clinicians. These problems arise, the clinician complains, because the basic scientist frequently is not conversant with the doctor's job.

Most behavioral scientists are at a disadvantage because they are not physicians and do not have certain important experiences. They have not gone to medical school and therefore do not have that body of knowledge that directs the thinking and behavior of physicians. In addition, they have no experience with nor any responsibility for the daily care of people's needs both personal and physical. Important ingredients of the "doctoring process" are missing. In an earlier paper I suggested that behavioral scientists who plan a career in medical education need specialized training. (9) Its purpose would be to prepare them for understanding the doctor's job. Such compensatory training is necessary so that when they come to tasks like curriculum development, they can make useful discriminations between a wide range of possible content.

Developing the model of the doctor's job(s) was not part of this study and is well beyond the scope of this paper. However, the efficacy of such a model can be illustrated by some glaring omissions in some of the case studies. Pain and the negative affects are cases in point.

Physicians are prime practitioners of pain control. In developing a model of the doctor's job, no one could argue that such a function was not a critical part of such a model. Yet the subject of pain is rarely taught in medical schools except by neurologists and pharmacologists. If you look at standard textbooks in psychology, the subject is not alluded to except perhaps in relation to cold pressor tests as techniques for studying stress. The situation is no better in textbooks of psychiatry. This is amazing given the enormous implications of the subject. In recent years, the work of Melzack, Sternbach and Zborowski and some others have been instrumental in bringing the subject to the attention of behavioral scientists. Despite its importance, only two of the nine case studies pay any significant attention to the subject of pain. If one used a well defined model of the doctor's job as a guide to content, then all of the behavioral science groups should provide significant instruction in the study of pain.

The negative affects, anxiety and depression are a second case in point. When people become ill (or perhaps just go for their annual physical) internal perturbations in one form or another are evoked. These feelings range from mild tension or a vague uneasiness to the more extravagant forms of anxiety and/or depression. Because these experiences are ubiquitous, specialists of various stripes in medicine have emphasized how important it is for physicians to understand the forms and functions of these emotions. Any analysis of the doctor's job should give a high priority to instruction in the biology, psychology, and sociology of the negative affects. However, in none of the case studies is there any reference to anxiety and depression as independent subjects of study. The doctor's job required in-depth knowledge of these matters and all programs should make specific provision for teaching them.

In considering the kind of content that is essential in preparing students to take care of people, the factor of time is of some consequence. The time devoted to a medical education seems to be contracting in two ways, at least in terms of its formal boundary lines. Absolute time is shrinking, e.g., the elimination of the internship, the three-year medical school, etc. But with the rapid increase in the number of subjects to be taught, time available for any one subject decreases. Behavioral science has significantly contributed to the problem by the number of courses it has added. While we talk of behavioral science as if it represented one subject, it is comprised of many disciplines each with a vast body of knowledge. The present study identifies six disciplines and there are others which might have been included, e.g., history, linguistics, etc. How are all of these subjects to be accommodated within the confines of the time we can reasonably expect to carve out? Shall we prepare a light smorgasbord so that everyone can have a taste of many delicacies? While no one may get indigestion, such a meal is likely to be neither satisfying or nourishing. Or shall we face the fact that we must make hard choices about what we are going to teach? My own view is that fewer subjects taught in greater depth and related to basic objectives, that is, primary patient care, will reap the greatest rewards. Expansionist policies may lead to the same disappointment as Cinderella's sisters who tried to fit too large a foot into too small a space. They experienced both disappointment and rejection.

Carefully selecting content to be taught in medical school involves eliminating material which is nevertheless important for educated physicians to be cognizant of. If my thesis that educational anemia will result from overcrowding the curriculum, then, perhaps, more living space ought to be sought elsewhere. The obvious place to prospect is in undergraduate education.

Applicants to medical school have been required to complete certain preparatory courses,e.g., English, organic chemistry, etc. As psychiatry's influence becomes more pronounced, some educators advised (and a few schools even required) students to take some undergraduate behavioral science courses. Psychology received most of the publicity but in recent years the broader social science point of view has been emphasized. Any experienced interviewer of applicants to medical school will appreciate its impact on student thinking. The applicant, almost on cue, would communicate to the interviewer how important he thought the study of human behavior was for a medical education. Whether he really believed this, it was clear that he had learned that such statements were *de rigueur* for a good interview. But these expectations coupled with the social unrest of recent years seems to have contributed to the number of medical applicants with preparation in the behavioral sciences. Twenty years ago it would have been impossible for a student to have majored in one of these disciplines and expect an admissions committee to sympathetically review the application. These circumstances no longer obtain. For example, while the numbers of behavioral science majors who are admitted are relatively small, they are astronomical in comparison to pre-1950 standards.

The recommendations to pursue behavioral science subjects during the undergraduate period, however, have been general and unspecific. The advice is to "prepare yourself" because "understanding human behavior" is important in treating patients. Perhaps the time has passed when we can be so casual in our suggestions.

The case studies indicate that one of the major consumers of time in the medical curriculum are those subjects which are concerned with medicine as an institution. I assume that the objectives are (a) to prepare students to cope with a changing socio-economic medical system, (b) to sensitize students to the effects of health care delivery on the various segments of the population, (c) to provide concepts, information and perhaps tools to students who may become physician-administrators, and (d) to change attitudes so that students who become physicians will be better informed citizens. The case studies leave me with the feeling that the time which is available is quite insufficient for these purposes. Given the nature of medical education, the "competitive effect" will insure that these objectives will be seriously impaired or fail.

The need now, I believe, is to more carefully "engineer" behavioral science experience at the undergraduate level. A sequence in medical behavioral science would provide the student with necessary concepts, information and attitudes while at the same time "economize" in terms of the formal medical curriculum. But economy is not the only issue. More solid preparation is important if we are to usefully tie behavioral science to the practice of medicine. The study of the history of medicine would seem to illustrate this point.

Knowledge of the history of medicine appears to be at or close to zero among medical students. My information does not derive from an objective study but rather from the experience of interviewing hundreds of medical applicants over a period of about thirteen years. As part of my interview, I always inquired into the applicant's familiarity with medical literature and history. "Not as a Stranger" was the odds on favorite in the fifties and almost the exclusive entry for literature. As far as history was concerned, DeKruif's "Microbe Hunters" was mentioned by a few. By the sixties, even that old standby had disappeared. I can't recall a student who had read any of the standard histories of medicine. When the applicant was queried about any of the popular giants of medicine, a blank stare was the most frequent response.

Why there seems to be such indifference to the story of the profession among applicants is probably worth further inquiry. But I think educators are remiss in not rectifying this deficiency. The reason is not that students need to know the story of medicine in order to practice medicine but because we are spending an increasing amount of time in medical school in trying to sensitize future physicians concerning medicine as a social institution. A history sequence has the great advantage of detailing the social, economic, psychological, political and intellectual currents which shaped the development of medicine. It would seem to me that much of the effort at instructing medical students in the institutional aspects of medicine might be accomplished by such an academic arrangement. In addition, electives within the history sequence might be available so that students could pursue special topics of interest in greater depth,e.g., politics of medicine, the development of medicine in socialist economics, etc. Under these circumstances, students would arrive in medical school with much more effective preparation for appreciating medicine as an institution.

Medical schools, in the end, may be forced to follow the general route that John Hopkins is pursuing. The undergraduate years will be harnessed in order to provide the general blueprint. In the behavioral sciences, such topics as medicine as an institution and theories of personality would be assigned to this period of time. Medical school "proper" would be reserved for those aspects of behavioral science which are more directly applicable to primary patient care.

PART III

Psychology's Contribution to a Medical Curriculum

Psychology's role among the behavioral sciences is unique for at least three reasons. Unlike its sister sciences, psychology administers vast territories, the borders of which are frequently difficult to identify. The behavior of all living organisms are subject for study. Psychology maintains strong alliances with the biological and chemical sciences because of the importance it ascribes to the relationship of behavior to the physical properties of the organisms. But psychologists are equally interested in understanding behavior, whether it be that of ants or humans, as a function of social organization. Between the biological and the societal, psychologists are engaged in studying a wide array of human events and activities. Sensation, perception, cognition, affects, conditioning, learning, development, communication, motivation, frustration and conflict, personality, abnormal behavior, the conditions of behavior change, etc.

The second distinctive feature is the fact that psychology has a strong technological tradition. In part this is based on the development of instrumentation for research purposes. But application of psychological findings to human affairs has always been an important objective. The study of human abilities led to the development of tests designed to identify human skills. Aptitude tests and measures of intelligence, for example, have had considerable impact in various areas of human endeavor. The study of the processes of learning led to teaching machines as well as techniques for developing as well as modifying various kinds of behavior. If Skinner's work had reached fruition during World War II, perhaps pigeons might have actually become a significant part of the guidance system for missiles. In any event, psychology has and continues to be actively committed to converting psychological information into methods which are directly applicable to the practical problems of people.

The third unique characteristic is psychology's clinical tradition. A significant proportion of psychologists are engaged in the direct care of emotionally disturbed people. It should also be noted that a fair number of these psychologists combine their clinical activities with research and teaching activities. However, it is the caretaking role which includes both the assumption of responsibility for other people as well as adherence to a detailed ethical code which provides a direct bridge between psychology and clinical medicine.

Psychology has obviously rich resources to contribute to a behavioral science program. However, since psychology is so well endowed, it makes the choice of content and method more rather than less complicated. Therefore some guide or model becomes essential as a means of making choices. In the previous section, I suggested that the framework of the doctor's job can be used as the guide to such decisions. In conjunction with this, I would reiterate the point I made in Part I which is that. . . "behavioral scientists carefully inventory their fields and in a sense apply a 'conversion factor' to each of the units which comprise such a listing. In other words, subject matter which has a high potential for being translated into usuable techniques and information in medical practice would rank high on a 'conversion scale'; those units which had little or no relation to medical practice in terms of clinical use would rank at the bottom of the scale."

The overriding issue is the shape of the behavioral science curriculum. If I were to make a single recommendation to psychology, it would be to convene task forces to examine various aspects of its facts, theories, methods and techniques. The purpose would be to identify that material which can most effectively be included into a curriculum which is heavily restricted by time limitations and which will be most useful in contributing to the care of "dis-eased" people.

What follows is an outline of topics which I think can be most usefully included in a core medical curriculum. There will certainly be dissent about these choices. However, if it stimulates debate over the issue of curriculum, then my objective will have been well served.

LEARNING

In recent years, there has been a significant increase in interest in learning theory. The reason for this lies in the fact that learning theory has provided a non-disease model for explaining many aspects of abnormal human behavior. Many physicians, particularly psychiatrists, have been uncomfortable with such a concept since they assume that the acceptance of a non-disease model removes a large sector of deviant behavior from the province of medicine. This, of course, is not so, since theoretical models, like music, transcend professional as well as national boundaries. If non-disease models can help people who are in trouble medically or otherwise, then this need be the only criteria for its utility.

There are two general areas in medicine for which learning processes are important. Learning theory has provided new insights into the mechanisms which may help explain both etiological as well as triggering factors in psychosomatic disease. In addition, recent studies indicate that techniques may soon be available which will be useful in modifying some kinds of psychosomatic response patterns. The first is an understanding of psychosomatic disease and the second is the application of methods designed to either elicit adaptive behavior (e.g., instituting speech patterns in the autistic child) or which modifies deviant or disruptive personality patterns and/or symptoms (e.g., elimination of phobias).

While the classical conditioning of autonomic responses is well known, it has only been in recent years that modification through operant learning has been demonstrated. There is now available a wide range of reinforcing stimuli that can be used to "train" a variety of psychophysical states. Heart rate, urine formation, intestinal motility, bloodpressure, vasomotor response and contraction of the uterus have been operantly conditioned. (10,11) Not only does this work provide a potential avenue for understanding such aspects of so-called psychosomatic disease but the research suggests that possible techniques for modifying these responses may be at hand, e.g., essential hypertension. (12)

The second important derivation from learning theory which is important to physicians are techniques that can alter several kinds of deficit and deviant behavior. Since people with these difficulties appear in the office of physicians with high frequency, knowledge of and facility with these tools make the study of learning processes a high priority item for the curriculum. The following examples illustrate the use of techniques derived from learning theory:

Pediatrician. Parents most frequently turn to this specialist for information concerning the emotional and behavioral problems posed by the children. Parents may simply seek reassuring information ("My six-year-old son is stealing money from my pocketbook. Is he going to become delinquent?") On the other hand, they may want the doctor to provide them with prescriptions which will be useful in altering behavior patterns considered disruptive, destructive, objectionable, etc. ("I can't control that child and sometimes (guilty weeping) I wish he were out of the home altogether.")

In the first instance, normative information about child behavior (Gesell is very useful) plus a reassuring manner and a few helpful hints (e.g., Keep your pocketbook out of reach) can go far to alleviate parental anxiety. In the second instance, developmental information is useful but specific strategies designed to change the course of events is called for. Are there any? The answer is yes. The behavioral science base is operant conditioning and the relevant research is being done by Patterson, Bernal and others.

Doctors vary in their desire to handle behavioral problems. Some feel it is a crucial and enjoyable part of their job; others see such problems outside their province. If the doctor decides not to deal with these problems in his practice, he must make a referral to those experts he assumes can handle them. The referral process involves considerable knowledge as to what methods are available for solving such problems.

If, in our mythical example, his medical school training has led him to the view that aggressive and destructive behavior is "sick" and that complex unconscious sources maintain it, then he is likely to make a referral to a child analyst or other experts who hold similar theoretical views about child behavior. If, however, he is also familiar with the operant model and the techniques derived from it, then an alternate referral possibility presents itself. He might even decide that psychoanalytic intervention might be ultimately necessary but decides on the operant condition methods to see if it "works." The decision might be based on such practical considerations that it is a very concrete technique which can be taught to parents (almost all of the "treatment" takes place at home) and that if it "works" results can be demonstrated in a relatively short time. Since the second technique is more economical in time and money, this may decide the issue. In exploring this with the parents, he may tell them that if there are no results then they might have to try the more complex and expensive analytic procedures.

We can suppose further that the pediatrician decides that psychological treatment should be carried out by him as part of the total care package. If he chooses the learning procedures, then he will make an analysis of the home situation, i.e., primarily current methods of control although other facets may play a role in this analysis. Once he has the necessary data, he will instruct the parents as to how to respond to various aspects of the child's "bad" behavior.[1] He will see the parents at intervals (more frequently at first) to see "how it's going," provide encouragement and to clarify the program's procedures.

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[1] The operant paradigm is based on a strict environmentalism in which behavior is determined by its consequences. Re-training the child depends on reordering the ratio of reinforcement to non-reinforcement in which the crucial variables are timing and consistency.

Another possibility exists. The doctor may feel that he does not have the time to devote to this form of treatment yet he is a firm believer that, as far as possible, children's problems should be handled in a single setting. Therefore, he assigns a nurse or other assistant who has been trained in the appropriate theory and technique to carry out the treatment under his general supervision.

Internist. Control of appetite is a frequent problem which this specialist is asked to solve. Both obesity and severe underweight have been difficult problems with which to deal. In recent years, research findings in obesity in which the operant model was the guiding theory have been promising. Probably the most successful efforts to reduce overweight people are Weight Watchers and similar organizations. Their techniques rely heavily on the variables that learning theorists consider crucial in changing behavior, i.e., social reinforcement, social aversiveness, etc.

However, specific techniques derived from the operant model have been applied to the treatment of severe anorexia nervosa. Bachrach and his associates demonstrated in one case that a dramatic weight change could occur by systematically manipulating the environment according to operant conditioning principles. Since then, others have also demonstrated the effectiveness of altering the anorexic pattern by using techniques derived from learning theory. (13)

Anorexia can be a life-threatening condition. It has been assumed that a complex internal process determines the onset and course of the disease. Treatment, therefore, has involved an attempt to alter the internal process. If this fails, more heroic and desperate measures such as tube feeding and shock treatment have been used. A theoretical model to explain the development of anorexia is still needed. But from a practical point of view, the operant model seems to give rise to some potent treatment measures. As in the previous examples, the treatment procedures are highly structured and can be taught to doctors, nurses, aides, etc. Generally, the treatment is carried out in the hospital because it involves considerable control of the environment. However, it is possible to execute procedures at home if the family can be mobilized as "helpers."

Family Physician. The last of these illustrations might take place in the family physician's office. A young man of twenty-two whom the doctor has taken care of for many years consults him about a paralyzing phobia. He wants to know whether medication, hypnosis, psychotherapy or whatever will help him. As in the other instances, the doctor may have the option of initiating the referral process or treating the problem himself. If he chooses to refer, he then must have some knowledge of local resources. The decision as to which expert to send the patient might seal the patient's therapeutic destiny, i.e., an analyst, an encounter group, a behaviorally oriented therapy.

The doctor decides that the patient can be helped by a behaviorally oriented therapy. The doctor has learned that systematic desensitization, a technique derived from learning theory, is very useful in eliminating phobias. In addition, he is enthusiastic about the method because he knows that the average number of re-training sessions is somewhere between twenty to thirty although the patient's time commitment is greater than this because he must carry out certain procedures on his own.[1] The theoretical forebears of the method are Pavlov and Hull. On the basis of Hull's learning model, Wolpe's research led him to develop the method of systematic desensitization which is designed to increasingly inhibit anxiety in relation to the phobic situation. (14)

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[1] Systematic desensitization is based on the thesis that if responses antagonistic to anxiety (i.e., deep relaxation) can be trained, then counter-conditioning can occur. Anxiety producing images are paired with relaxation which results in the inhibition of the anxiety response.

In these three instances, methods of treatment derived from behavioral theories are applicable to problems physicians are called upon to solve. Therefore, they would rank high on the conversion scale since they have considerable potential for translation into clinical skills.

COMMUNICATION

Of all the subjects with which we are concerned, communication has the highest priority in terms of its direct utilitarian value. Physicians need to use communication skills more often than any other technique that is available to them. The psychology of as well as the methods for promoting effective communication should rank high in any curriculum. The "tool" value of developing communicative skills are as follows:

(a) Interviewing is an indispensable aspect of medical practice since it represents a basic method for getting information necessary to formulate hypotheses and decisions about diagnoses, prognoses, the choice of diagnostic tests and treatment. Skillful interviewing can produce in a brief period of time observation and information required to achieve these objectives. In addition, the well conducted interview represents the most reliable vehicle for developing an effective doctor-patient relationship. (15,16) The physician who is expert in establishing lines of communication will, in general, have a more cooperative and emotionally comfortable patient with which to deal.

(b) Some physicians are "natural born" psychotherapists and have always seen such a function as a part of medical practice. In recent years, there has been an increasing attempt to educate physicians in psychotherapeutic skills which are applicable to an office practice. (17) The core of such training involves sophisticated knowledge about patterns of communication.

(c) Another important aspect of communication covers the effect of various messages given to patients whose objective is to change behavior. For example, physicians frequently find it necessary to have patients alter some aspect of their life style for health reasons, e.g., stop smoking, lose weight, take a rest, etc. The findings of social psychologists indicate that different forms of communication may have variable effects on the audiences to which it is directed, e.g., high fear messages are generally ineffective in changing health habits. (18, 19, 20, 21)

(4) Patterns of practice are changing so that physicians are increasingly involved with large organizations and the community. For example, group practice involves managing ancillary personnel, e.g., nurses, medical and laboratory technicians, receptionists, etc. How one communicates with these paraprofessionals may have considerable influence on how efficiently the organization is run and, in many instances, how effectively patients are cared for. Another role for physicians will be that of administrators in large public or privately operated medical systems, e.g., HMO's. Communication skills will be needed not only in terms of managing the internal organization but in developing and maintaining effective relations with many aspects of the public sector.

PAIN

The obvious reasons for an in-depth presentation of pain has been previously alluded to. Since the ultimate clinical objective is the management of pain, the relevant behavioral information could be organized around the following three themes:

(a) Pain stimuli is not necessarily equivalent to pain response. (S≠R)

There are several theories such as Melzack and Wall's gate control hypothesis which attempt to account for discrepancies between the stimulus and response. (22) There appears to be important perceptual, cognitive, learning, emotional and personality characteristics which contribute to an understanding of the phenomena, e.g., intense pain in relation to minor or seemingly absent stimuli. (23,24) Physicians need knowledge about these matters in order to enlarge their scope of information so that they have a broader base for problem solving. (25,26,27)

(b) Pain intensity appears to be roughly correlated with the emotional state of the patient.

Emotions, particularly anxiety and/or depression, appear to play a significant role in the experience of pain. How these affective components shape the response to pain is extremely important since the physician must learn how to intervene at this level in order to ameliorate the pain experience. (28)

(c) Pain may represent a method of communication.

Many people have learned to use pain as a method of communication. It becomes a vehicle for informing others about a variety of troubles with which they have been struggling. The physician needs to understand what knowledge is available about the development and uses of pain for interpersonal transactions. Doctors must learn to listen and decode pain language. Pain amelioration involves helping the patient substitute the language of pain with verbal statements directly related to the psychological conflicts.

In addition, the techniques for pain control can be classified under the following headings:

(a) Audio-Analgesia: This method involves the alternate use of "white noise" and music. This technique has been used in dentistry, obstetrics, pediatrics, etc. While this method has few adherents currently, it is of interest because of the important relation between attention, interference, distractability and pain. (29,30)

(b) Placebo Effect: The placebo is important in medicine and physicians should appreciate its role to use it when appropriate. Placebo influences can modify pain perceptions. (31,32)

(c) Psychotherapy: The use of various techniques which are classified under this heading may be employed for the purpose of pain management. In some instances, the physician may elect to employ these methods. In other circumstances, he may decide to refer patients to other specialists. If he chooses to refer, he nevertheless should have some knowledge of the psychotherapeutic methods available.

The relation of hypnosis to pain control should be emphasized since it may provide a useful tool that the physician can employ in his office, e.g., using hypnotic techniques to induce deep relaxation in order to diminish the intensity of tension headaches. (33,34)

STRESS, DISEASE AND MEDICAL-SURGICAL ENVIRONMENTS

The preservation of physical, psychological and social integrity are ongoing lifetime tasks which can be studied from the perspective of the effects of stress on the human organism. Threat, the central concept in a theory of stress, has two major psychological characteristics: (a) "It is anticipatory or future oriented." (b) "It is brought about by cognitive processes involving perception, learning, memory, judgment and thought." (35) Since illness or the expectation of illness is a direct threat resulting in a wide range of behavioral responses that can influence physiopathology on the one hand and patient management on the other, stress becomes a high priority topic. In the former instance, the role of stress can be studied in at least three ways: (a) stress as an etiological agent, e.g., in peptic ulcers, hypertension, headache, etc.; (b) stress effects in promoting pathology, e.g., psychological consequences in cardiac disease; (c) stress from the effects of disease which alters behavior, e.g., the effects of dizziness, tinnitus, sensations of pressure and loss of hearing in Meniere's disease. (36)

The themes upon which instruction should be based are: (a) What do we know about various effects of stress on physiology? (b) How do people identify, process, organize and respond to threatening medically related information? (d) What techniques are available to help patients deal with stress through a realistic appraisal of danger and which can modify the impact of potentially disorganizing stressful experiences? The basic method is establishing effective communication. Other methods can be discussed under the heading of control, affiliation, rehearsal and information. (37)

A second feature of stress concerns the unique social environments of the hospital, e.g., surgical wards, coronary care units, hemodialysis units, rehabilitation services, psychiatric in-patient hospitals, etc. Serious problems are posed because these environments have the potential for heightening stress. For example, recent observations on a hemodialysis unit indicates that all of the patients on the ward appeared listless, depressed and seemed to have established no channels for communication among themselves. What are the stress factors involved and what are the implications for treatment? These examples can be multiplied a thousand fold by anyone familiar with these special environments. Psychologists have been active in studying not only medical environments but others as well which have a potential for producing high stress, e.g., on naval vessels, in airplanes, in small groups isolated in the arctic, in environments in which sensory experiences are experimentally controlled, etc. (38, 39, 40, 41). They have compiled much valuable information from these studies that bears directly on this problem. Students should be alerted to the fact that environmentally generated stress can have anti-therapeutic consequences to patients. They should be made equally cognizant of the procedures available which can reduce unnecessary stress and accelerate the recovery process.

DIAGNOSTIC SYSTEMS

Diagnosis is a fundamental tool in medical practice since it frequently is the guide to both treatment and prognosis. Concepts of diagnosis concerned with behavioral disorders involve many problems which distinguish them from that used in the rest of medicine. However, we teach psychiatric diagnosis as if there were no distinctions among diagnostic concepts in other aspects of medicine

Several serious issues concerning diagnosis have been raised in the last several years. (42) Our current system shows poor inter-rater reliability between experts in diagnosing specific behavioral disorders although greater success has been achieved in terms of broad categories, i.e., psychosis, character disorders, etc. (43) Sharp variations in diagnosis occur between hospitals in different parts of the country and even between nations, e.g., the English have a penchant for manic-depression and the Americans for schizophrenia. Questions have been raised about the etiological value of our classification system. A diagnosis of Alzheimer's disease refers to a known diagnostic process in the central nervous system, but what does the diagnosis of hysteria imply etiologically? If one uses psychoanalysis as the point of reference, a statement about etiology can be made. But if one uses a behavioral system, then etiology is meaningless. In the same vein, issues related to treatment arise. Paresis and brain tumors which alter behavior can be specifically treated by penicillin or brain surgery respectively. However, what is the specific treatment for schizophrenia and depressive reactions. For both, the recommendation would probably be psychotherapy. However, the kind of therapy might be highly variable depending on the theoretical bias of the doctor. By the same token, it needs to be pointed out that the diagnosis might have some specific utility if drugs are to be part of a therapeutic regime, e.g., 300 mg. of thorazine in the over-active schizophrenic and 100 mg. of elavil for the depressive.

Other issues need to be brought to the student's attention such as the stigmatizing effects of psychiatric diagnoses. For example, a diagnosis of psychosis can have significant occupational, social and legal reverberations. In addition, a "self-fulfilling prophecy" may occur since a diagnostic label, such as schizophrenia, may affect the attitudes of the individual so tagged, e.g., as hopeless.

There are several other themes which could be included in this section concerning problems of classification. However, the importance of classification systems needs to be underscored since such systems are important not only for descriptive and communicative purposes but ultimately for predictive ones as well. However, the present state of diagnostic systems, related to behavior, needs to be outlined for students so they can deal with such issues in a more sophisticated and meaningful manner.

THE PSYCHOLOGY OF AFFECTS

Anxiety and/or depression probably represents the most common problem seen in medical practice. In 1948 Arthur Schlesinger (44) described anxiety as the "official emotion of our age" although in recent years some authors have suggested that depression is a close contender for this honor. As far as medicine is concerned, these affects surface either because illness is anticipated, as a reaction to a diagnosed disease, as the symptoms of a disease, or as a response to a series of life stresses. Because of their ubiquity, the curriculum should provide a niche for an in-depth examination of their available biological, psychological and sociological information. While anxiety and depression are subjects which are included in other units of study, I think their significance as a public health problem makes it sufficiently important for them to be studied in their own right.

Critical topics that might be included are physiological, chemical and psychological theories, (b) anxiety and depression as learned responses, (c) the effects on cognitive functions and behavior, (d) their relation to personality styles, e.g., state-trait anxiety, (3) measurement of affects, (f) methods of control (45,46).

There is one further topic that might be included in this section. Hope is an experience that people need most of the time. The need to help patients hope and maintain their optimism is an informal function of the physician. While this subject has not been widely explored, some psychologists have been attempting to understand the nature of the experience. (47) It should be brought to the student's attention since hope is not only a humanistic concern but may have important consequences for mastering illness and extending longevity.

PSYCHOLOGY OF BEHAVIOR CHANGE

The objectives of this unit are to provide medical students with information concerning the relevant facts that influence behavior change. There are three classes of students for whom such knowledge would be important. The first group consists of students who will become internists, pediatricians, family physicians and the like but who will want to utilize psychotherapeutic methods in their practice. A second group consists of those students who will become psychiatrists. The third group are students who, when they become physicians, will be faced with the problems of referring patients to mental health specialists. They will be asked questions of all sorts by patients seeking help for a wide array of psychological problems many of which will concern therapeutic measures. A base of information will be useful in intelligently answering questions concerning such problems and may prove quite helpful in making a proper referral, e.g., to an analyst, an encounter group, a hypnotist, a behavior modifier, etc. In addition, this material should prove most useful for all students in preparing them for their studies in clinical psychiatry.

This unit of study might be divided into two main categories: (a) Systems of psychotherapy and (b) Psychotherapy as an art and a science.

Students are confused by the welter of "schools" which have formulated theories and/or methods of psychotherapy. Therefore, it is valuable to develop a scheme of classification which group systems with common roots. (48,49,50) Such a classification might be as follows:

(a) Psychoanalytic, Classical: A biologically oriented system in which instinctual drives and environmental demands are the major personality variables for personality development. Since developmental conflicts do produce emotional damage, treatment is directed toward eliminating the unconscious traumatic forces that control behavior. Insight is the major factor that accounts for behavior change. The relationship with the therapist is viewed as a vehicle for promoting insight since it provides data for interpretation rather than having significant implications for change in itself.

(b) Psychoanalytic, Social-Cultural: Biological factors are less important than other variables such as the disorganizing effects of socially learned anxiety, the search for security, and the struggle to find ways of relating to the world. Past interpersonal experiences are the roots of anxiety and determine the character of pathological behavior. Treatment is aimed at evaluating interpersonal experiences with insight as the significant variable that changes behavior. However, greater emphasis is placed on the direct learning effects involved in the doctor-patient relationship, e.g., corrective emotional experience.

(c) Phenomenological Approaches: These include client-centered therapy, gestalt treatment and existential approaches. The basic theme is that the problems of living derive from unhappy, crippling human experiences. Treatment is focused on helping patients re-experience themselves in new, intense and creative ways. The therapist is a much more direct participant in the treatment process. The rationale is that there is a difference between looking at someone and seeing them. In order to "see" the patient, the therapist must participate with him on a very human level. Rogers underscores this point when he says that "...the best vantage point for understanding behavior is from the internal frame of reference of the individual himself." (48) Phenomenological therapists use a variety of methods such as interpreting, challenging, provoking, counseling, directing and advising. Encounter groups, group therapy marathons, nude therapy and the like are techniques recommended for helping people re-experience themselves creatively. Insight is only one of several factors that may account for behavior changes.

(d) Behavioral Methods: Learning theory, which has been previously discussed, is the source from which the behavioral techniques are derived. These methods tend to be quite mechanistic. While there are classes of techniques (e.g., desensitization, flooding, aversive conditioning, etc.), the patient's problems need to be carefully evaluated in order to identify the appropriate treatment procedure. The goal of behavior therapy is narrowly defined in that the objective is either to elicit or eliminate specific behaviors. While communication, interpersonal relations and insight are important to the other categories of therapy as agents of behavior change, they are considered negligible or incidental to this form of treatment.

In the second segment of this unit, a distinction would be made between psychotherapy as a science and as an art. There are "principles" which guide all psychotherapeutic efforts, e.g., communication, interpersonal relationships, learning, etc. Psychotherapy, in many instances, "works," often dramatically. However, it needs to be made clear to students that from the standpoint of science, the reason it "works" is far from clear. It still remains a mystery why some people treated by a particular method make significant gains while others under seemingly similar circumstances remain stationary or even regress. The relevant variables that produce behavior change still need to be scientifically adduced. Selected research findings and comparative treatment results should be reviewed. (51, 52, 53, 54, 55, 56.)

Again, it should be emphasized that some grasp of the status of the psychology of behavior change is important since physicians will either be directly engaged in psychotherapeutic activities or will be actively involved in the referral process.

GROWTH AND DEVELOPMENT

All the behavioral science units in medical schools seem to agree on the relevance of this topic although it is difficult to determine whether there is a consensus concerning content. Some schools may teach from a biological framework, others from a psychodynamic position, still others from a learning theory point of view, while the remainder might accent a sociological approach. Probably some of all these views are discussed in the typical course.

Growth and development is generally assigned somewhere between ten and sixteen hours of class time. For those students who have no background, the number of hours allotted is just about enough time to provide students with the general architectural plan. Since educators see the topic as extremely important, perhaps this should be part of pre-medical preparation. The time allocated in medical school would be organized to illustrate the relation of growth and development to practical medical problems.

The following topics are suggested as those which illustrate utility but they obviously do not exhaust the possibilities:

(a) Developmental Norms: This is baseline information which physicians can use to assess developmental deviations. In addition, such information is valuable in counseling parents, teachers or other surrogates who are responsible for the care of children and adolescents, e.g., intellectual development, perceptual-motor lag, stealing, aggresion, sexual interest, phobic resonses, etc. (57,58,59)

(b) Age Related Response to Illness: The effects of disease occurring at different developmental periods can have significant effects on behavior and pose management problems for the physician: For example, infants who fail to thrive may have significant neurophysiological deficits that are aggravated by an inhospitable environment; (6) The traumatic effects upon a two-year old child who is hospitalized for an operation and the parents are excluded for significant periods of time; (61) A school age child who develops asthma at a time when physical and psychological requirements demand high levels of activity is faced with significant adaptation problems; (62, 63) A teenager who has increased demands for food as well as needs to conform to peer group rules develops diabetes. This precipitates severe conflicts that may result in serious violations of a rational medical regime. (64)

(c) Death and Dying: While the subject is usually only incidentally included in growth and development, there are important age related correlates. There are a range of problems to be considered depending upon whether a dying patient is three, eight, seventeen, thirty-five, sixty or ninety. Developmental concepts of death, critical psychological factors in dealing with death at different age levels and the doctor's role in relating to the dying patient are useful themes around which to organize this topic. (65,66,67)

(d) Mental Retardation: The normal or abnormal development of intelligence is predicated on a broad array of factors. Mental retardation which is a significant public health problem provides a useful vehicle for discussing the concept of intelligence and illustrating the factors which may impair its development. For example, genetic determinants (phenylketenuria, Tay-Sach disease, mongolism); birth injuries (infection, prematurity, asphyxia, trauma to skull, etc.); post natal causes (physical injuries and diseases such as encephalitis and convulsive disorders) and psychological-environmental factors (emotional deprivation, serious cultural limitations, psychoses, etc.) are useful in illustrating etiological factors in mental deficiency as well as the limiting factors in intellectual development. (68)

(d) Ageing: Because "death control" has been so successful, the percentage of people over sixty-five has increased rather substantially since 1900. An increasing number of people over sixty-five appear in the doctor's office with multiple complaints. Most physicians who care for the elderly would agree that the psychological problems are extremely important complicating factors in the illness they present. It is often difficult to sort out, for example, how much of the mental confusion seen in the elderly male is due to arteriosclerosis and how much to the feeling of abandonment. (69)

There might be three objectives for this unit: (a) Trying to alter attitudes about the "crock" syndrome on the one hand and emphasizing that the physician is as important an emotional resource as a physical one for the elderly; (b) Presenting typical medical problems to demonstrate the relation between physiopathology and the socio-psychological status of the patient; (c) The effects of organic states on psychological functions. Eisdorfer's recent work on the relation between hypertension and cognitive functions is an excellent example. (70)

MEASUREMENT

The development and application of measuring instruments has been a major enterprise for psychology. In fact, psychology's entrance into medicine occurred because several test methods were deemed valuable as aids to diagnosis.

Most physicians, however, other than psychiatrists, do not use psychological tests in their practice. There are at least three reasons for this: (a) Most physicians assume that test administration and interpretation require the expertise of psychologists; (b) They have had no adequate instruction in the application of tests for diagnostic purposes in the context of an office practice; (c) Testing is assumed to be too time consuming.

Each of the above reasons is both valid and invalid. There are problems that require rather long and complicated procedures. For example, using the Reitan battery as an aid in diagnosing a brain lesion involves special equipment, expertise and time. Nevertheless, there are tests which can be quickly administered and scored that provide useful diagnostic information. The Zung test for depression would be useful in rapidly providing diagnostic information. (71) The "minimult" (a brief form of the Minnesota Multiple Personality Inventory) could be used to obtain further information about suspected behavioral disorders. (72) The interested physician could even train assistants to score and interpret these diagnostic aids.

However, if the experience of the past is a criterion, it seems unlikely that most physicians will make use of psychological tests. The major rationale for including some instruction in concepts of measurement and test instruments is that they will have occasion to refer patients for psychodiagnostic studies and/or be recipients of reports describing psychological test findings.

The approach to instruction in the use of tests for diagnostic purposes should be on a very practical level. This can best be accomplished by formulating diagnostic questions that physicians are likely to encounter. "The patient is a 62-year-old male who has shown a gradual deterioration of his personality in the last six months. Is there evidence that central nervous system pathology may be involved?' "This 24-year-old married woman complains of severe fatigue, headaches and a 'loss of feeling.' Are psychological factors playing an etiological role in these symptoms?" "This 45-year-old woman has recently had a radical mastectomy. There is evidence of increasing depression accompanied by statements that 'life is useless.' Are there suicidal risks?" Tests can be discussed in the context of providing answers to practical questions. However, both the patient's medical history and future destiny should be included in order to demonstrate both the value and limitations of testing procedures.

ETHICAL ISSUES

Ethics has always been an integral part of the practice of medicine. A new challenge to ethical responsibility lies in the rapid advance of basic science knowledge. As a consequence, new, radical and even frightening technologies are being or will be devised. The physician of the future will be asked to make complex decisions about human life and conduct, the consequences of which we can only dimly foresee.

Psychology is directly involved in the ethical controversy because many of the current and anticipated medical technologies are directly related to their effects on human behavior. Ritalin, for example, appears to be useful in controlling the behavior of a certain percentage of hyperactive children. Its use, however, has been attacked by some because they see its use as a means of insuring social conformity. They criticize parents, physicians and educators for having little tolerance for the atypical child. In assigning children to a drug, additional educational efforts need now be expended and responsibility for their care diminished. Others have suggested that vicarious learning may take place so that a child on ritalin may later become more vulnerable to the "drug culture." This poses several problems for the physician. Does he have a responsibility to evaluate these various points of view before he prescribes drugs such as ritalin? Assuming that he is cognizant of these issues, is it his responsibility to discuss these matters with the child's parent? Does he have the right to withdraw a drug which may have specific beneficial short term effect because of potentially dangerous long term consequences?

Ritalin is an example of a current drug controversy but there are others in the making. We appear to be on the threshold of the development of drugs which are designed to "improve" all sorts of psychological functions, e.g., intelligence, memory, violent behavior, etc. Kenneth Clark, a recent past president of the American Psychological Association has suggested that drugs might be developed with the aim of controlling the abuse of power. (73) If such drugs become a reality, the moral and ethical problems would be staggering. Physicians would have powerful tools in their hands with which to exercise enormous power over other people.

In addition to drugs, there is work in progress which promises to produce technologies which may be quite potent in the control of human behavior. One such area is the electrical stimulation of the brain (ESB). The work done to date suggests that ESB might be able to produce rather refined control over several behavioral functions. (74) Psychologists have also been developing techniques which, while they are still in their infancy, are viewed by some as being capable of having potentially malignant effects on society. "The Manchurian Candidate" posed the problem of the application of such methods of control on a fictional level. (75) A recent motion picture, "A Clockwork Orange," develops the theme of a vengeful society's use of aversive conditioning therapy to emotionally cripple an individual it considers an enemy. The moral question which is posed is that these methods have the potential of destroying an individual's capacity for free choice even though it presumably serves the "public good." The ultimate question is who defines the "public good." Skinner has suggested that behavioral engineering be applied to society as a whole in order to achieve a world where "people are truly happy, serene, productive, creative and forward looking." (76) But who is to define happiness, serenity, productivity and creativity? Is Skinner's dream of a vast behavioral technology a utopian dream or the nightmare of 1984? (77)

The physician of the future will find himself at the center of the controversy. It is likely that he will play an important role in influencing societal decisions about the use of these technologies. But on a more personal basis, he may be faced with decisions about the use of those methods with individual patients. It seems reasonable that we begin to prepare medical students not only about the nature of these methods but about the controversies surrounding their ethical use. (78)

Final Remarks

There is a bit of philosophy currently in vogue which states that there are "different strokes for different folks." This observation is quite applicable to contemporary medical education. Diversification of the curriculum is "in" and conformity is "out." This has sparked considerable debate over whether the restrictions placed on the traditional curriculum for the sake of permitting students greater control over their educational experiences may not lead to a generation of superficially trained practitioners. Some educators such as Mellinkoff are apprehensive. His target is specifically the growing influence of the behavioral sciences. "But it is possible that the complicated task of improving the distribution of good medical care may not be made easier by crowding sociology into the time for physiology or cultural anthropology into the time for internal medicine." (79) While it is an inference from the above statement, I assume Dr. Mellinkoff also feels that the social sciences have nothing to contribute to either physiology or internal medicine.

Behavioral scientists would disagree and I hope not only for partisan reasons. Nevertheless, we have a responsibility to make clear to students and medical educators alike that our contribution is substantial rather than frivolous. The burden of this paper has been that we can do this best by pruning the subject matter of our several disciplines in order to identify that content which has utility for solving practical medical problems.

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SOCIOLOGY AND MEDICAL EDUCATION

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SOCIOLOGY AND MEDICAL EDUCATION

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Introduction

The primary purpose of this report is to describe the current status of sociology in the medical schools in the United States. To understand its present position, however, we consider it essential to examine first the historical origins of medical sociology both as a scholarly discipline and as a collaborating profession in medical education. Against this perspective, and drawing upon case studies collected specifically for this report, the major trends and issues in the status of sociology in medical education today will be interpreted.

Historical Perspectives: Antecedents of the Post-War Trend

The place of sociology in American medical education, although still subject to questions of what, where, and how it can be most effective, appears to be established. Kendall and Reader, for example, assert categorically that sociology "has already contributed much to medicine, ... has (in its work related to medicine) developed a distinct body of knowledge, (and) in fact, reached the position where it can contribute substantially to decision making in medicine." (42) This is in contrast with Reader's own earlier assessment, in 1963, (55) when he spoke more of "the promise" of sociology's contribution to medicine than of its accomplishments.

Paralleling its intellectual growth, the position of medical sociology in the structure of the medical school also has advanced. Unlike its previous dependency upon existing departments, such as psychiatry and preventive medicine, current trends are toward either separate departmental status as a major equal partner of the behavioral sciences or divisional status within socially oriented clinical departments.

Looking first only at the intellectual side of its historv, there are traditional concerns of sociology as a general field which can be seen to have direct relevance to medicine. Prior to World War II, scholarship had been established in demography, mobility, social deviance, and social stratification, all of which included inquiries with specific or indirect implications for issues of health. There were also direct contributions to medicine: in the social etiology and ecology of disease, the social components in therapy and rehabilitation, and medicine as a social institution. (55) Of the several sub-areas in medical sociology which have shown sustained growth, more recently, only the sociology of medical education had no pre-war antecedents. This shift to direct and major involvement by sociology in both medical research and medical education has been, in itself, an important subject for inquiry. Merton, for example, provides one of the most penetrating interpretations of the motivating forces in both medicine and sociology which have drawn them together. (48) On the influences of World War II which turned psychiatry toward social science for major collaboration, Ginzberg and his associates give a fascinating and detailed picture. (21) These are only two in a lengthy list of review articles and books which present both facts and interpretations about the sources of what has been called the behavioral science movement in medical education. (11, 13, 18, 56, 79, 26, 39, 78).

Official sanction for the joining of social science to medical education was manifest in the first teaching institutes of the Association of American Medical Colleges (AAMC). In 1951, the AAMC Teaching Institutes were inaugurated with a conference on the teaching of psychiatry. The report of that conference, held in Ithaca, reveals a strong favorable interest in the development of a significant role for social science in medical education. (54) The same perspective was present in the second AAMC Institute at Colorado Springs dealing with teaching of preventive medicine in the undergraduate medical school. For the report of the Ithaca meeting, Norman Cameron was commissioned to write a proposed course outline. The resulting chapter in the Ithaca proceedings, (9) titled: "Human Ecology and Personality in the Training of Physicians," was widely used in the next decade as a blueprint for preclinical courses in the basic sciences of behavior, usually taught by psychiatry. Within the Cameron model, sociology was allocated an equal portion of teaching responsibility with psychology and psychiatry.

The Cameron teaching model was an early watershed of the post-war behavioral science movement. Before turning to the post-war period in more detail, however, definitional questions about the term, "behavioral science," and the place of medical sociology in behavioral science are germane.

Sociology and Behavioral Science: Some Issues of Definition

As used currently, behavioral science (or, synonomously "the behavioral sciences" — no specific distinction appears to be implied by the use of either the singular or plural term) has an operating history of only about twenty-five years. This designation is not derivative in any sense from the psychological theory called "behaviorism."

About its general intent, there is no disagreement. Behavioral science, as a field of inquiry, represents an attempt to integrate several older parent or basic areas of scholarly work within a more comprehensive and up-to-date approach to the study of man. Its integrative and interdisciplinary character is clear. Opinions differ, however, concerning which scientific disciplines should be included within its rubric.

Of the two major definitions which are distinguishable, one is a comprehensive view including an array of biological, psychological, and social sciences in collaborative inquiry concerning human behavior. The other usage involves an interdisciplinary view in a much more limited sense, restricted to collaboration among the fields of sociology, anthropology, social psychology, and the psychology of human growth and development.

The comprehensive approach to behavioral science started in

1949 when, "a group of scientists at the University of Chicago, some of whom ... moved (as a group) to the University of Michigan, began to consider whether a sufficient body of facts exist to justify developing an empirically testable general theory of behavior." (50) The leader of the group, James E. Miller, explains that the term "behavioral sciences" was coined with the intention that its apparently neutral connotation would be acceptable to both social and biological scientists, and that it would supersede the alternative, "social science," which some might confuse with socialism. Later, the Center for Advanced Study in the Behavioral Sciences was established at Palo Alto; and in 1956, a new journal Behavioral Science, appeared. The Mental Health Research Institute at the University of Michigan became one of the best known cornerstone groups. As a division of the Department of Psychiatry in the medical school, it developed a staff drawn from psychiatry, psychoanalysis, general psychology, social psychology, neurophysiology, political science, economics, mathematical biology, and education. Sociologists and anthropologists were added later in its history.

The second definition of behavioral science equates this field more closely with social science. Anderson and Seacat conclude that the term "social science" was dropped in favor of "behavioral science" in the study of health and illness because social science was regarded as too generic, including not only sociology, anthropology, and social psychology but also economics, political science, and history. (1) Here again, in this limited definition of behavioral science, the choice of the term was influenced by a reluctance to confuse "social" with "socialism." Although these two are the major applications of the phrase "behavioral science," they are not the only ones. For our purposes, it need only be added that medical schools, in the increasing effort to include this area of study, generally have sought to operationalize a third definition which, in the words of one study group, is:

> In a medical context, the minimal connotation of behavioral science should be an integrated study of biological, psychological, and socio-cultural facets of human behavior. The term "sciences basic to human behavior" might therefore be more appropriate. (29)

Both the comprehensive (psychosocial-biological) and the more restricted (social) interpretations were applied and developed separate histories of their own, parallel to each other. The selective emphasis depended upon given institutions and people. Wherever formal codification was required, definitions were sufficiently broad to allow both interpretations to flourish, either separately or together. For example, when, in 1958, the National Institutes of Mental Health offered grant support to stimulate the expansion of medical school teaching programs "leading to a broader understanding of human behavior as it relates to health and illness," the purposes of the program were described in the official announcement as follows:

1. To bring more knowledge of human behavior to the student and to acquaint him with the ways and means by which this knowledge is acquired.

2. To develop research models for the study of behavior which will be as meaningful and strong in their impact on medical education as those presently available for teaching in long established basic science departments and in other branches of medicine.
3. To provide improved ways and means for the student to learn about the nature of the multiple factors - social, psychological, and biological - which affect the maintenance of health and the prevention of disease and disability.
4. To make possible the development of behavioral science teaching as an integral part of the modern physician's education.

Under this very broad mandate, it would certainly seem possible for both types of behavioral science emphasis to be supported. Of course, to assess the trends of actual events, one must look at the types of programs which were actually supported after the NIMH grants for teaching of human behavior in medical schools were activated in July of 1960. Other government programs, of course, also adopted this broad definition of the field. NICHD (The National Institute of Child Health and Development) is an example.

The open character of the definitions, however, did not necessarily have liberating effects. One body of opinion argues the opposite; namely, that the variety of definitions had a constraining effect upon the field. The term, behavioral science, implies (in the latter view) a certain misplaced concreteness which in fact does not exist in the body of concepts and methods. As a consequence of the ambiguity of the term, individual behavioral scientists are said to exist only mythically by label and, as such, are uniquely vulnerable to misrepresentation and impossible demands. This is essentially the basis of the rejection of the term by sociologists like C. Wright Mills who charges that:

> The (field) Behavioral Sciences is simply impossible; it was thought up, I suppose, as a propaganda device to get money for social research from Foundations and Congressmen who confuse "social science" with "socialism." (51)

"Medical sociology," is an alternate term preferred by some scholars who otherwise might be called behavioral scientists. It is by this name that most of the contributions by sociology to teaching and research in medicine have been identified. Here, too, an undue constraining effect has been charged to a label which some sociologists have decried as placing an over-emphasis on the physician and his role in medicine to the exclusion of other components in the health system.

The Sociology of Health

When we speak of the sociology of medicine today, (the sociology of health is increasingly preferred) we mean the application of the concepts and methods of sociology as a social science to the systematic study of medicine as a social institution, the fabric of the health system, and problems of health and illness. Earlier conceptions were quite different.

Europe in the mid-nineteenth century saw intense struggles by the middle class for political and social rights. (68) With reference to these struggles, Salomon Neumann, a German physician, asserted that "medical science is intrinsically and essentially a social science, and as long as this is not recognized in practice we shall not be able to enjoy its benefits, and shall have to be satisfied with an empty shell and a sham." (58) This sentiment captured the interest of a group of physicians in Germany for a short period, and inspired in their work a heightened social sensitivity and social responsibility. As the middle class attained its objectives, however, the momentum of social concern waned. "A revival of this spirit," Stern writes, "appeared in England and the United States as a by-product of the pressures of the working class for social security legislation and for wider recognition of their democratic right to share more fully in the vast economic and cultural advances of the period." Chadwick's extensive report of 1842, studying the sanitary conditions of the British people, was an example of an early crystallization of this spirit in a sociological research. "In both (England and the United States)," Stern adds, "social medicine was associated with progressive movements that brought larger groups of people into the orbit of medical services, as they widened the conception of social participation and responsibility and put greater demands upon those who possessed political, social and financial power." (68)

Social medicine, of course, is a distinctly different historical phenomenon from the sociology of medicine (health). In the nineteenth century, the distinction was unclear, but subsequently social medicine, especially in the United Kingdom, was used to designate efforts of the medical profession whereas the sociology of health refers more to the work of social scientists themselves. As late as the 1950's, the concept of social medicine was regarded by scholars like Stern to be vague and ill-defined. "In its most developed form," Stern wrote, "(social medicine) remains largely a groping effort on the part of the medical profession and other health workers to deal with the fact that the patient is a personality, has a family and is a member of society, when considering his health and diseases. It does not seem too audacious to assume that since this is already taken for granted by sociologists who have not been obliged to work their way tortuously from an absorption with specific diseases of special organs to an understanding of the patient as a whole and to the social context of health and disease, we may demand more mature formulations of principles and more concrete guidance from a sociology of medicine." (68)

In the United States, major pioneering contributions to the beginnings of a social science of medicine were made by Stern (69, 70) and Michael Davis (14) beginning in the late 1920's and by Henry Sigerist (16) and Shryock (62) on the 1930's. The writings of all four, however, were mainly historical. Stern and Sigerist emphasized the influence of economical factors on medicine. A share of pioneering credit should also be given to Oswald Hall (30,31,32,33) whose work in the 40's provided a model for the application of sociological methods to the study of the career and social role of the physician. As can be seen, all of these writers, though they conscientiously devoted themselves to a rigorous application of social scientific methods, chose problems for inquiry which were of special interest to public health specialists and to social medicine. As a consequence, these writers are sometimes overlooked by modern medical sociologists while they are well known in the fields of preventive medicine and social medicine.

There were, of course, other developments in both sociology and medicine which contributed to the early origins of the field prior to World War II. Among these, Lawrence Henderson's seminar on Pareto, and the interest in the sociology of medicine which he stimulated at Harvard University in the 1930's deserve special mention. (35,36,37,38,7) There were also studies of sociological aspects of work, and what has come to be called the sociology of the professions, both of which received a signigicant amount of attention from sociologists but not with specific reference to medicine.

Meanwhile, a separate but related introduction of social science appeared in the field of psychiatry in the late 1920's and thirties. The work of Sullivan, probably more than any other, symbolizes this historical development, particularly his studies of a schizophrenic ward. (74,75) Soon afterward, and heralding the descriptive studies of informal social life in the hospital which have become so important recently, were the researches of Rowland (59,60) and Devereaux. (15) Vivid demonstration thus was provided to show how the ethnographic methods of anthropology could serve inquiry into the meaning of hospitalization as a therapeutic process in itself. This approach was a radical departure from previous conceptions which saw hospitalization mainly as a custodial backdrop for the specific therapy of medical procedures. Following quickly after the war were similar hospital studies by Maxwell Jones (41) Stanton and Schwartz (65,66,67), Barrabee (3), Caudill (10,12), Greenblatt (27,28), Belknap (4), Goffman (24,25), von Mering and King (77) and others.

Since the mid-fifties, the volume and scope of studies in the field of the sociology of health have rapidly expanded. Sociologists who hitherto had focused their efforts in other areas as well as a growing number of their graduate students have contributed studies covering a wide range of health related topics. Some represented continuities of types of inquiry which were long established, such as the social epidemiology of disease. During the last several decades, such studies run into the hundreds. (26) Recent review articles also document studies of patient-practitioner relations, the significance of social status and deviance in the etiology of illness, the social organization of medical practice and the delivery of care, the recruitment and socialization of members in the several health related professions, and the organization of the health system.

It is notable that many issues are now being studied which initially were dealt with only indirectly or not at all, such as the power structure of the medical school (8, 5), the role of professional associations in society, (71) and the dynamics of medical practice, (19, 20). Interest is also growing in cross-national and cross-cultural studies, (22, 57) encouraging hope that a comparative sociology of health systems will evolve.

These developments owe much to several organizations which marked the sociology of health as a field for their special interest. First mention without any doubt should go to the Russell Sage Foundation. Their Department of Studies in the Professions was started in 1944. Much preparatory work, however, preceded this date. (23) To Esther Lucille Brown, more than any other, this department owes its beginning. In more recent years Donald Young has joined Brown in the active promotion of contributions to medicine by sociologists. Included in the activities of the foundation, especially during the 1950's, were (a) a postdoctoral fellowship program for social scientists who wish to gain experience in professional settings such as medicine, social work, and law; (b) the sponsorship of research in the sociology of medicine; (c) the financing of new programs in medical education; and (d) the support of individual workers during the writing of specialized books in the health field. (28, 61, 77)

The Milbank Memorial Fund is another organization which has had a long-standing concern with the relationship between the social aspects of illness and the organization of health services. This interest dates to the beginning of the Fund in 1903, and include activities which have frequently combined the efforts of physicians and social scientists. Among the projects Milbank has supported are demonstration public health programs, pioneer work on the U. S. National Health Survey, the Hagerstown studies of the 1920's, and the Montefiore demonstration project. Its more recent efforts have focused on the social epidemiology of mental illness, and, in the 1960's, shifted to the support of a broad range of activities by social scientists and community oriented physicians in both the United States and Latin America. One example is the Fund's fiscal support to extend the activities of the Medical Sociology Section of the American Sociological Association. This sponsorship served as the cornerstone of many of the Section's subsequent activities.

The influence of the Commonwealth Fund has also been significant, although much less broad and continuous than that of either the Russell Sage Foundation or the Milbank Memorial Fund. Particularly in the study of the sociology of medical education, The Commonwealth Fund has played an important part. The seminal studies by Merton and his associates, reported in The Student Physician, were stimulated and supported by The Commonwealth Fund. They have also been instrumental in such important projects and inquiries as are represented in the work of Hammond and Kern (34), George Miller (49), Lief (45), and others.

If there is legitimately one organization which may function as the spokesman for modern medical sociology in the U.S., however, it is probably the Section on Medical Sociology of the American Sociological Association. This organization had its origins in what was called the Committee on Medical Sociology, which was started informally in 1955 by a group of Yale sociologists led by August B. Hollingshead. The Committee, though independent, gradually developed unofficial ties to the American Sociological Association. Not until 1959, however, was this relationship formalized in the creation of the Section on Medical Sociology. The growth of this organization has been rapid. By 1971, for instance, the membership had grown to over 800 members. Similar developments have occurred in the United Kingdom and Canada. (2)

Teaching Sociology in Medicine

Clinical medicine is accustomed to benefiting from the division of labor in science, accepting specialists from different disciplines in its teaching just as it accepts and applies their research findings. Some of these sciences, like pathology and biochemistry, work directly with problems of health and disease; others, like physiology, do not. Sociology in medicine today has been compared with physiology nearly a century ago. (9, 56, 64) Like physiology, it is concerned with the description of human functioning, but in the social group rather than in the individual organism. Like physiology, it has been assigned a place mainly in the preclinical teaching of medicine, as a science of normal behavior which is basic for the full understanding of those deviations from the normal which are called pathological. As such, it is the most recent basic science adopted by the medical curriculum.

Following World War II and for a decade after, sociologists joined hands with medicine principally in research. This was a period of what might be called intellectual trial, in which the capabilities of the discipline as a field of inquiry were being tested. The result, as discussed briefly above, was a wide range of research. The mid-fifties saw a shift from preoccupation with research to the effort specifically to involve sociologists in the teaching of medicine on a substantial scale. The character and growth patterns of this phase have been documented by Straus, (72, 73) New, (52) the Group for the Advancement of Psychiatry, (29) and Webster, (78) and others. Perhaps most important, a series of textbooks were produced, beginning with Simmons and Wolff (63), and including Paul (53), Jaco (40), King (43), Susser and Watson (76), Bloom (6), Freeman, Reeder, and Levine (17), Knutson (44), and Mechanic (47). This was a time of the synthesis of knowledge and the testing of methods to communicate the special frame of reference of sociology as part of the education of physicians.

There was considerable self scrutiny and analysis throughout this period by sociologists themselves to record and evaluate the development of its role in medical education. In 1960, the Section of Medical Sociology of the American Sociological Association sponsored a preliminary study and in 1969, the study which is reported here was initiated.

As stated in the early chapters, the decision of the present study was that intensive analysis of a set of institutional cases would be more appropriate for understanding the current state of the field than a complete survey of the field. It should be kept in mind that these case examples were chosen to represent a variety of approaches to the task of teaching sociology to undergraduate medical students, and not as a cross section of the total effort. With one exception each of the programs included in this study was established since the mid-1960's. Each program typically has an interdisciplinary staff of between eight to ten psychologists, sociologists and other scholars and assumes responsibility for instruction to medical students, and in some instances, other health professionals and Ph.D. students in sociology.

Turning now to the findings of this study, discussion is predicated on two assumptions about the nature of organizations. First, it is assumed that there are appreciable differences as well as similarities in the structures and processes of various medical schools. Although a scholar's previous experience and ascribed attributes are vital considerations in his recruitment to a faculty, how he subsequently fares, his degree of isolation from or integration in the subcultures of the students and faculty, and his success in competing for scarce academic advantages are primarily shaped by his work setting. The second assumption made here is that a man's working conditions influence what and how much he does, how he perceives his role and is seen by others, the extent to which he is exposed to stress and how he sees and resolves dilemmas in his place of work.

Recruitment. At the time when data were gathered, approximately 90 full time social scientists were teaching in the seven schools which were studied. Certain attributes in this group are similar, and confirm previously reported trends. This is, for example, a youthful group with a higher than average number of women than in parent social science departments (or for that matter, medical departments). Senior staff but almost invariably never junior instructors have held one or more health-related posts. A strong interest in interdisciplinary collaboration, the repute of a particular professor or a university and the enforcement of taboos by other departments against institutional incest (particularly women) were frequent reasons given by individuals for joining these units. Unlike some of the earlier attempts at establishing these programs, many of the staff held effective cross-appointments in departments of their respective specialties (e.g., anthropology, psychology, sociology, etc.)

Despite the rapid growth of each program, the augmented staff size had not been achieved without considerable difficulties in members accommodating to working in interdisciplinary settings.

> "Not the least of concerns is the intimate working relationship of a number of staff people with diversified interests, different training backgrounds, split (if not divided) departmental allegiances. There is probably no easy short cut for numbers of hours or years in contact to bring diversity of discipline and interest under some comfortable rubric of 'behavioral sciences'."

> "The difficulties...consist in the problems involved in getting faculty members from the 'behavioral sciences' to work together sufficient for the particular task at hand. Anyone from one of the constituent fields well knows the difficulties imposed by 'academic tribalistic' boundaries. While this type of problem is to be acknowledged it is not insuperable. It is in some respects a matter of split loyalties, a type of conflict that each individual faculty member has to work out for himself."

Annual staff turnover rates (difficult to assess in certain instances because of uncertain full-time versus part-time staff denominators) averaging about 10 per cent reflect these difficulties. The main reason given by members leaving these programs (50 per cent) was to "seek a stronger identity with a basic discipline."

Curriculum. There is consensus about much of what should be taught to students as well as how this instruction should be provided. It was not always made clear in these studies, however, that the curriculum which was outlined refers only to those materials presented by the social scientists involved in the study. Excluded for each of the schools was that portion of behavioral science instruction given by other social scientists who were not members of the unit being described or provided by clinicians in their contacts with medical students. Bearing this caveat in mind, all of the programs included sections on: the social and cultural aspects of illness; doctor-patient relations which may or may not include interviewing and communication; concepts of personality, and a range of social-pathological problems, and aspects of the health system. These represent a limited selection from a wider range of topics which have a potential relevance to medical education. For example, well developed sub-fields like socialization, social deviance and the sociology of work or the professions are hardly noted in the reported offerings.

The Work Setting. Each of these faculties either had been recently established; or there had been substantive changes in the composition and orientation of its staff resulting in a major restructuring of the school's curriculum. Indeed, it has been suggested that lack of agreement in academic interests may be at stake in the uncertainty of acceptance of social scientists in Canada's sixteen medical schools.

> "In some medical schools professors are still skeptical about the relevance or utility of these disciplines. Obviously in these settings such programs have not been started. In other faculties two discernible trends have evolved: some in which social science programs have been started; others in which a strong public espousal of the merits of these topics has not yet been matched by the creation of relevant teaching units. In the latter case questions of the professional competence of the academic newcomers and the need to share responsibility for topics which have already been pre-empted by physicians may well be the issues at stake." (2)

Considering the structure of a medical school and the composition of its faculty, a complete integration of the activities of social scientists with those of basic scientists and clinical physicians is improbable, and perhaps undesirable. But there are various levels of integration and types of accommodation which may occur. The nature of a scholar's institutional affiliation determines to whom he is unknown or with whom he associates, how he is accepted informally by other faculty members and under how much social stress he may work. The extent for instance to which there is equal access by discipline to information and resources affecting the activities of a faculty varies in our subject cases depending upon whether sociologists were in settings with: (1) a high degree of automony (e.g., an autonomous department); (2) a degree of autonomy within distinct units (e.g., a division of a medical department); or (3) minimal autonomy (e.g., under the aegis of an inter-departmental committee).

Certain portions of the curriculm content, as might be expected, varied depending upon the setting in which social scientists worked. Human growth and development and interviewing skills and concepts were emphasized by sociologists working in psychiatric settings: these fields were relatively ignored by those in community medicine. The reverse trend holds for instruction on social issues in health and the organization of health services. Also, in their health-related research, autonomy appeared to be directly related to the nature of the research which was undertaken. More projects dealing with basic social science issues were reported among sociologists in autonomous units. Researchers in less autonomous settings tended to report a register of research interests which occasionally approximated a short disease listing culled from Index Medicus.

Further differences are evident which appear to be caused most basically by the degree of work autonomy. Members of the more autonomous programs were more likely to serve on committees with the highest level of policy making power, on search committees for new chairmen of other departments, on committees on promotion and tenure, and on committees for faculty curriculm and examinations. Little criticism was voiced by scholars in these more autonomous units concerning administrative procedures, and allocation of space or of budget. Perhaps because of their more extensive involvement in a school's general activities and a more broadly gauged understanding of how decisions were reached and what were the school's concerns and priorities, the staff of these departments reported little if any personal hostility or criticism of the activities of the administrative hierarchies of their institutions.

None of these conditions characterized the experience of sociologists who worked under conditions essentially of dependent organizational status and definitely restricted autonomy. Their involvement in a representative range of faculty committees was limited. They had few administrative responsibilities of importance which would provide them with information channels, and they had minimal responsibility for the handling or planning of budgets and appointments. These conditions appear to reduce personal satisfaction, vocational interest and career commitment. These conclusions are drawn from the following type of data in the case studies:

> "The behavioral science program has very little funding directly under its control...there is no central area where many or most are located; some retain offices in the given behavioural science department; one has two offices each representing one leg of the joint appointment; while others have offices located primarily in the medical school. Similarly, the base for teaching is widely diffused throughout the campus.
>
> Whatever administrative arrangement is ultimately arrived at, the behavioral scientists who are involved must be provided with the opportunity to interact among themselves over a period of time; must have a forum to themselves, a common meeting ground in which they can, in fact, hash out some of the internecine quarrels that are endemic to the academic fractionalization of knowledge and which will sub-

sequently give them the chance to speak as a group outside and have impact on the decision-making procedure of that outside contact in matters which affect their professional standing and professional contribution to medical education. They need, in short, peer group support as the context for their individual endeavors."

"These approaches carry with them certain risks. A continuous process of negotiating between the knowledge base of the behavioral sciences, the practice-oriented objectives of the medical schools and student interests might tend to produce sacrifice in the academic content of the course. This may actually have occurred in some instances at this institution and the faculty are currently groping with this problem."

"No money is tagged by the department as belonging exclusively to behavioral sciences. The psychologists and sociologists are well supported by the department, but teaching in the basic sciences program is not directly tied into such reports. Rather, the individual is supported for a variety of reasons, primarily having to do with general contributions to the department and the responsibility of the various teaching program coordinators to try to obtain teaching time from these individuals on a cooperative basis. Control of these funds then rests specifically with the chairman of the department. There is no formal procedure or "routing" to the dean or other administrators.

Behavioral sciences should be represented at the highest level of administration by a behavioral scientist who is competent to understand the medical school culture and, indeed, may have experience as a physician. Ideally, behavioral sciences should be taught as part of the clinical as well as pre-clinical experience...the most difficult part of this would be to set up a behavioral sciences program which would not be competitive with a psychiatry department."

"Out of seven health center committees, social and behavioral scientists are represented on only three, and specifically are not represented on the important and powerful General Research Support Grant Committee which dispenses funds to various research projects and student fellowships...Certain key persons in the social and behavioral science group appear to carry more than their share of responsibility in this regard, e.g., nine appointments; six; five; five; five. It is of interest that none of these men is a "pure" social scientist and that only two have specific training in a

> recognized social science discipline." (Seven members of this program referred to "lack of facilities" and "administration support.")

Who criticizes whom and how that criticism was acknowledged and dealt with varied by a program's degree of autonomy. Certain difficulties were reported in each case study. However, particularly hostile opposition appears to have occurred in reaction to those scholars who worked as relatively isolated individuals in medical departments or who were affiliated with broad-based interdisciplinary committees. The source of such criticism, it was reported, derived mainly from members of basic science departments. The objections made by the basic scientists have a familiar ring: the field was too soft; its practitioners were ignorant about their own discipline or about medicine; and valuable curriculum time was being wasted.

> "The notable critics of the program have been the chairmen of anatomy, biochemistry, physiology, microbiology and some segments of academic experimental psychology. It should be noted that none of these "critics" are outspokenly against the program's existence, but rather are critical that it should be included as a "basic science" program, and would argue for a more "rigorous" approach. A parallel argument is that (it is)... not appropriate in teaching basic science and furthermore that this provides the department of...which houses the behavioral sciences, over-exposure in terms of capturing the students' interest in furture career involvements."

> "It was from the basic biological scientists that the strongest reservations came. A number of them saw little purpose in the behavioral science dimension to the curriculum...Some specific individuals from the basic biological sciences did make known--and continue to manifest--their antagonism in various settings, formal and informal."

Central to the oppostion of the basic scientists in these settings may have been a potential threat perceived to their roles as scholars and competition for curriculum time granted to social science.

What emerges from these case studies is that while Behavioral Science has typically been strongly supported by the administration of a medical school and certain chairman of clinical departments, viable acceptance throughout a school does not occur until social scientists constitute a program or department with essentially equal status to the other working units of a medical school. When this does not happen, the basic science departments may regard social science as the protected protégé of a Dean or clinician, and as an intrusion into "their curriculum time." Thus, social scientists may become lightning rods for otherwise veiled tensions between competing groups in the medical school. These may be basic scientists versus clinicians, as described by Bucker in her study of the faculty of the University of Illinois School of Medicine: "It is difficult for a Ph.D. to work for long in a medical school without being burned a few times...Clinicians made absolutely outrageous statements about Ph.D.'s (which) did rankle." (8) It also happens between the protagonists of educational reform and those who favor more traditional teaching. Whichever, the social scientist is a favored target just like other newcomers to the scene before him unless he is placed in a position which allows him to negotiate on fair terms.

All of which proves only a dictum which is hardly surprising: that strong sponsorship is required to introduce a new discipline into the curriculum of the medical school. Historically other innovations in a medical school such as biochemistry or psychiatry have faced stiff criticism and have had a broad assortment of initial alignments prior to achieving relative institutional autonomy and stability. Until this is reached for social scientists working in medical schools these scholars may feel that they are constantly "on trial." In sum, from the case studies, it appears that those social scientists who were not in autonomous settings are often relatively powerless to shape much of what is important for their own careers in a medical school or to influence its destiny. It is only when strong sponsorship is joined with a modification in the structure of a medical school either in creating a discrete unit, a division or a department, that a new discipline such as sociology is introduced on terms that allow effective fulfillment of the tasks which are being assigned to it.

It is interesting to note that the dilution of basic scholarly capabilities may well occur more in a slowly evolving situation when time allows the buildup of great pressure for accomodation as compared with the introduction of a group of scholars, strongly sponsored, and established from the beginning in an organizational unit with viable autonomy.

The Steps Ahead

The position of sociology in medicine is, at this moment in time, ambiguous and subject to cross-pressures. On the one hand, never has the demand for sociologists in medical institutions been greater. (78) On the other hand, the cry of "too many Ph.D.'s" threatens to cut off the supply.

A vitalized interest in the community and in the reorganization of the profession's delivery of care have stimulated an unprecedented request for sociological consultation, research and teaching in community medicine. At the same time, the interest in the medical school curriculum has persevered, and although definitions of this term vary, a role for sociology is generally given a significant place. Against this background, it is particularly ironic that training programs are being reduced, caught in the general retrenchment of higher education.

In this difficult and innovational field, the ideal response to medicine's demand would come from a substantial number of very able sociologists, knowledgeable and experienced in the actual functioning of health institutions. However, the impression gained from careful review of the current roster of sociologists in medical faculties is that we are far from achieving the desired ideal. The social scientists involved in these case studies are a youthful group who typically have had only limited opportunities for interprofessional collaboration, the teaching of medical students or experience with the operations of medical schools. Some of their comments indicate the types of frustrations and obstacles, which they feel impede optimal work. As an individual and institutional "sifting out" process occurs, in essence, as these men gain familiarity with a new work setting, their general scholarly contribution to the health professions should become more cogent and valid. Their efforts in this respect, it would appear from the case studies, can be hindered or facilitated by the type of work setting to which they are assigned, a question over which they usually have little control.

Certainly, there are individuals who are able to combine attributes of basic scholarship and special skill in health areas, but a large majority of the total are young and relatively inexperienced. Given the pressures for narrow specialization which, it must be recognized, do exist in health settings, the academic integrity of these young sociologists is in jeopardy unless protected by strong organizational structures within medicine and by connections to parent disciplines.

Concerning this study itself, despite the aspirations of the scholarly and fiscal sponscrs, it can only be considered a small step toward its objectives. What is called for is a much more comprehensive review of the current state of the field. Essentially, this would involve examining programs which have failed as well as those which have survived, the nature and significance of the scholarship of academics working in different settings, the extent to which, when accomodations are made, they are functional or dysfunctional; and what these trends connote for sociology, the changing face of medicine and, ultimately, for the well-being of society.

What does acceptance of these programs connote for the values of their host institutions? Among the various factors stimulating these changes may be "an artificially fostered readiness" in which behavioral science in medicine may be perceived "as an anodyne for anxieties fostered by conflicts in society." (46) Certainly it cannot be assumed that these schools because of their inclusion of a particular community-oriented discipline are necessarily more liberal in outlook than other faculties, for historically medicine has been a pragmatic polygamist in testing the virtues of "would-be-mates." (48) That not all medical schools in the United States and Canada have as yet accepted this innovation suggests (as in the introduction of other specialties) that there is an acceptable breadth of variability in medical education. Considering the profession's pivotal contribution to man's well-being, it is not completely self-serving to hope that these changes represent a creative effort to align the physician's role to society's changing circumstances.

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A BIOBEHAVIORAL CURRICULUM
FOR MEDICAL STUDENTS

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A BIOBEHAVIORAL CURRICULUM FOR MEDICAL STUDENTS*

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There is now increasing awareness that behavioral disturbances and social conditions may interfere or combine with physiological functions in ways which result in disease, modify convalescence or help maintain health. Social and economic factors at community, institutional or organizational levels can also interfere with the delivery of health services to those who most urgently require them. Consequently there has been a growing utilization of behavioral scientists in medicine, and a recognition of the need to add behavioral science knowledge to the traditional basic science and clinical aspects of the medical curriculum. Before doing so however, it would be well to take a more critical look at the existing biological basis of medical practice to which behavioral science is to be joined.

At the present time, the biological basis of medical practice, as represented by the basic sciences of anatomy, biochemistry, microbiology, physiology, pharmacology, etc. is almost completely devoted to functional biology.** From the viewpoint of a biologist, functional biology represents only half of the significant thought and theory in biology - the other half constitutes evolutionary biology (2). In the absence of evolutionary biology in the curriculum all evaluations of what is "scientifically valid" continue to be made with the criteria of functional biology. One consequence has been that the split in medical training between the "hard-core" clinical areas of internal medicine, obstetrics, pediatrics, gynecology, neurology, surgery, etc., and the "soft-core" areas of psychiatry and psychoanalysis is continued and enhanced. Another likelihood is that the basic science and behavioral science curricula that are now being contemplated will constitute two parallel but separate tracks which seldom meet. Indeed, those who have initiated behavioral science programs in medical schools have already voiced this concern.

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*Contribution from the Comparative Behavior Laboratory of the Human Development Center, Department of Psychiatry.

**For example, a recent comprehensive work, entitled The Biological Basis of Medicine (1968) which runs to six volumes and over 3,200 pages, does not contain a single article devoted to phylogenetic or ontogenetic aspects of the human neuromuscular system, and the ontogeny of behavior, among its 85 papers. (1)

From this it follows that one function of the biobehavioral curriculum would be to provide (1) a background of biological mechanisms for linking the material of the behavioral sciences with that of medicine, and (2) a biological basis for a rapprochement between the so-called hard-and soft-core areas of clinical medicine. These two goals are closely related.

An evolutionary approach to the development and functions of the neuromuscular system, as developed in ethology, the embryology and ontogeny of behavior, etc. is currently missing from most medical curricula. Neurophysiology and neural science treat the neuro-muscular system almost exclusively within a functional framework, rarely from an evolutionary viewpoint.* Pediatric neurologists, however, are beginning to incorporate into their thinking and training programs a neuromuscular maturational perspective. (4), (5), (6). With the exception of a few programs in physiatry, such material as concerns itself with the ontogeny of neuromuscular patterns is relegated to the training of occupational and physical therapists. The medical student is seldom exposed to its theoretical foundations. What little evolutionary perspective was obtained from comparative anatomy is rapidly being obliterated with the reduction of hours devoted to anatomy in current programs. Even after they receive their degrees, most medical students and physicians are unable to consider the behavioral aspects of human development from a biological viewpoint.

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*The foreward (by one of the editors) to a large volume (almost 1,000 pages) on The Neurosciences warns of the "specialist approach that fails to see the forest for the trees." Nevertheless, not a single paper is devoted to the phylogeny, ontogeny or maturation of behavior (as two editors have noted), with the possible exception of one devoted to the postnatal growth and differentiation of the mammalian brain. (3)

It is the thesis of this paper that all medical students will have to be exposed to basic research findings and concepts in the biobehavioral fields, and their application to the various clinical areas of medicine if (1) they are required to translate behavioral science concepts into functional biology and (2) they are to cope with the future needs and developments of medicine. Relevant materials will be drawn from the following areas:

(a) Ethological research and concepts
(b) Prenatal origins of vertebrate and human behavior
(c) The postnatal, neuromuscular maturation of infant and child
(d) Neuromuscular aspects of emotional behavior
(e) The role of emotions in maturation and development, including primate studies on separation, depression, etc.
(f) The interrelationships of behavior, metabolism, and physiology
(g) The shared homeostatic and heterostatic functions of behavior and the autonomic nervous system
(h) Biological clocks and rhythmicities
(i) The biobehavioral basis of human character and social behavior

Another selection, or combination of topics might serve as well or better than the above one. To a considerable degree the curriculum should grow out of and reflect the skills, interests and enthusiasm of those teaching it. The approach outlined here is one which reflects the writer's biological and behavioral interests and their relation to various clinical areas and problems in medicine. Its intent is to stimulate medical students to consider and formulate a model of human development and behavior capable of being integrated with both the behavioral sciences and the clinical areas of medicine.

ETHOLOGICAL RESEARCH AND CONCEPTS

Current ethological research and concepts are the result of a comparative biological approach to the study of animal behavior. They trace their origin to Darwin's chapter on Instinct in the Origin of Species, wherein he pointed out that the concept of the gradual evolution of animal structure was equally applicable to a consideration of animal behavior. (7) Much confused thinking about behavior is directly traceable to the endeavors of various schools of behavior to separate a biological approach to behavior study from the related biological approach to animal structure. The problem is more one of semantics than reality, for at cellular and submicroscopic levels genetic changes in behavior are equally structural. The validity and contributions of the ethological approach reside in the fact that it is possible to observe and objectively record genetic changes in behavior at the motor level long before their microscopic base can be ascertained, just as in medicine behavioral symptomatology was correlated with disease processes long before their physiological base could be identified.

It is precisely this molar approach which has provided us with biologic concepts and insights regarding behavior which it is doubtful that neurophysiology would have uncovered. It is doubtful, for example, that neurophysiology would have uncovered the fact that the concept of homology applicable in comparative anatomy is equally applicable to the behavior of related categories of animals, that behavior patterns have taxonomic validity, i.e. behavior patterns may be used to identify taxonomic categories of animals, including species. Just as microbiologists have turned to the physiological and biochemical characteristics of microorganisms, when their structural features were inadequate for identification, so zoologists such as Whitman (8), Wheeler (9), and Heinroth (10) turned to the behavioral identification of the animals they studied. To be used as a valid taxonomic character, the trait selected, whether structural, physiological, biochemical, or behavioral, must possess only one feature - genetic constancy within the taxonomic category for which it is utilized. Once it had been ascertained that behavior patterns possess such genetic constancy, then it follows that like other characteristics, behavior must also be subject to evolution. Evidence derived from isolation experiments, in which an animal is reared apart from any members of the species to which it belongs, but nevertheless performs movement patterns characteristic of the species, further supports the genetic origin of such behavior.

The basic approach of ethology to behavior is centered around this fact, namely, that together with genetically determined structural, physiological and biochemical characteristics, animals possess a repertoire of inherited or innate patterns of behavior. These range from the initial respiratory, locomotory, and feeding behavior patterns of newborn animals to complex sequences of courtship, mating and parental behavior displayed by adult animals. The methods and concepts of ethologists have been indicated in numerous books (11),(12), (13), (14) and other publications, (15), (16) but their salient findings may be summarized as follows:

1. Ethology begins with the particulate units of movement and behavior which have been termed fixed motor patterns, (17) or fixed action patterns. They may more accurately be described as genetically determined neuromuscular coordinations. They are released by key stimuli of other animals, such as structures, color patterns, scents, calls, body movements, postures, etc., which uniquely characterize the appropriate object for such behavior. These key stimuli are termed releasers, or social releasers, since they frequently mediate the social behavior of two or more animals.
2. Fixed motor patterns are discharged whenever the proper releaser is presented, even by "dummy stimuli", provided that the animal is in an appropriate physiological state. Thus, male sticklebacks in the reproductive state will attack other red-bellied males that enter their territories, or even bizarre-shaped dummies, so long as their bellies are painted red, but when not in a reproductive condition they will ignore the same releasers.
3. Such responses to releasers suggests that fixed motor patterns are normally inhibited by some other activity in the central nervous system, and that some neural mechanism undoes or uncouples the inhibitory action upon excitation by the appropriate releaser. This hypothetical mechanism has been termed the innate releasing mechanism or IRM.
4. By making use of various artificial models, or dummies, which possess one or more releasers, it is possible to experimentally quantify behavioral responses, or to otherwise measure them with various recording devices, just as one quantifies other physiological responses. Such quantitative studies of fixed motor patterns show that

these behaviors depend upon the combination of *the strength of the releaser* and the *internal physiologic state of the animal*. The internal state of the animal can influence or modify the threshold of a response. In extreme cases lowering of the threshold may give rise to *vacuum activity*, in which the motor pattern is discharged in the absence of a stimulus.

5. Fixed motor patterns are also capable of being elicited by artificial releasers, or dummies with exaggerated key stimuli, which have a greater releaser effect than the normal releaser object. Such strong artificial releasers are sometimes referred to as *supernormal objects*, or supernormal sign stimuli.

6. Apart from their value as particulate units of behavior, capable of being objectively recorded, fixed motor patterns have been shown to be subject to or associated with various types of lawful behavior phenomena as follows: a) When two conflicting sets of releasers are presented in equal intensity to an animal - for example, releasers for aggressive and escape behavior - the animal frequently will not perform either its sequence of aggressive or escape motor patterns, but will exhibit another, semmingly irrelevant motor pattern, which is referred to as a *displacement activity*. (18) Displacement activities are predictable behavioral phenomena in specific experimental situations. This suggests that they are the lawful result of physiologic activities within the central nervous system. Several hypotheses have been put forth to account for displacement activities, but their governing principle is still not fully understood. b) The social object which releases a given sequence of motor patterns may display releaser stimuli for a single functional pattern of response, or for two different response patterns. Or we may experi-

mentally create dummy objects which contain two sets of releasers. For example, a herring gull will brood egg-shaped objects, but will carry away broken egg shells which are bloodied and red. If we place egg-shaped dummies, painted red, in the nest of a herring gull, either parent upon returning to the nest may initially sit on and attempt to brood these egg-shaped dummies, but a little later will peck at or carry these red objects out of the nest, then again attempt to brood them. Such ambivalent behavior may thus be studied at the perceptual-motor level of response. c) In addition to conflict and ambivalent behavior, the arousal of two separate sequences of behavior may result in their superposition, which gives rise to a new behavioral combination or expression. For example, an aggressive goose will extend its neck, while a fearful one will display a withdrawn, bent neck. In combination, an extended, but partially bent neck indicates a mood of fearful aggression. Dogs and other mammals have likewise been shown to superpose the two responses of fear and aggression in varying combination. Superposed motor patterns are of significance not only in animal expressions, but in the evolution and expression of human emotions.

d) While the all-or-none law of physiology may be true for the motor unit, a nerve fiber with all the muscle fibers it supplies, it does not hold for sequences of motor patterns. When the stimulus for a complete response is of low intensity, or is combined with a lowered physiologic state of the animal, various incomplete sequences of motor patterns may occur. Consequently, animals may display any transition from slight indication of a specific motor pattern, referred to as intention movements, to complete sequences of an

LAWFUL PHENOMENA ASSOCIATED WITH FIXED MOTOR PATTERNS

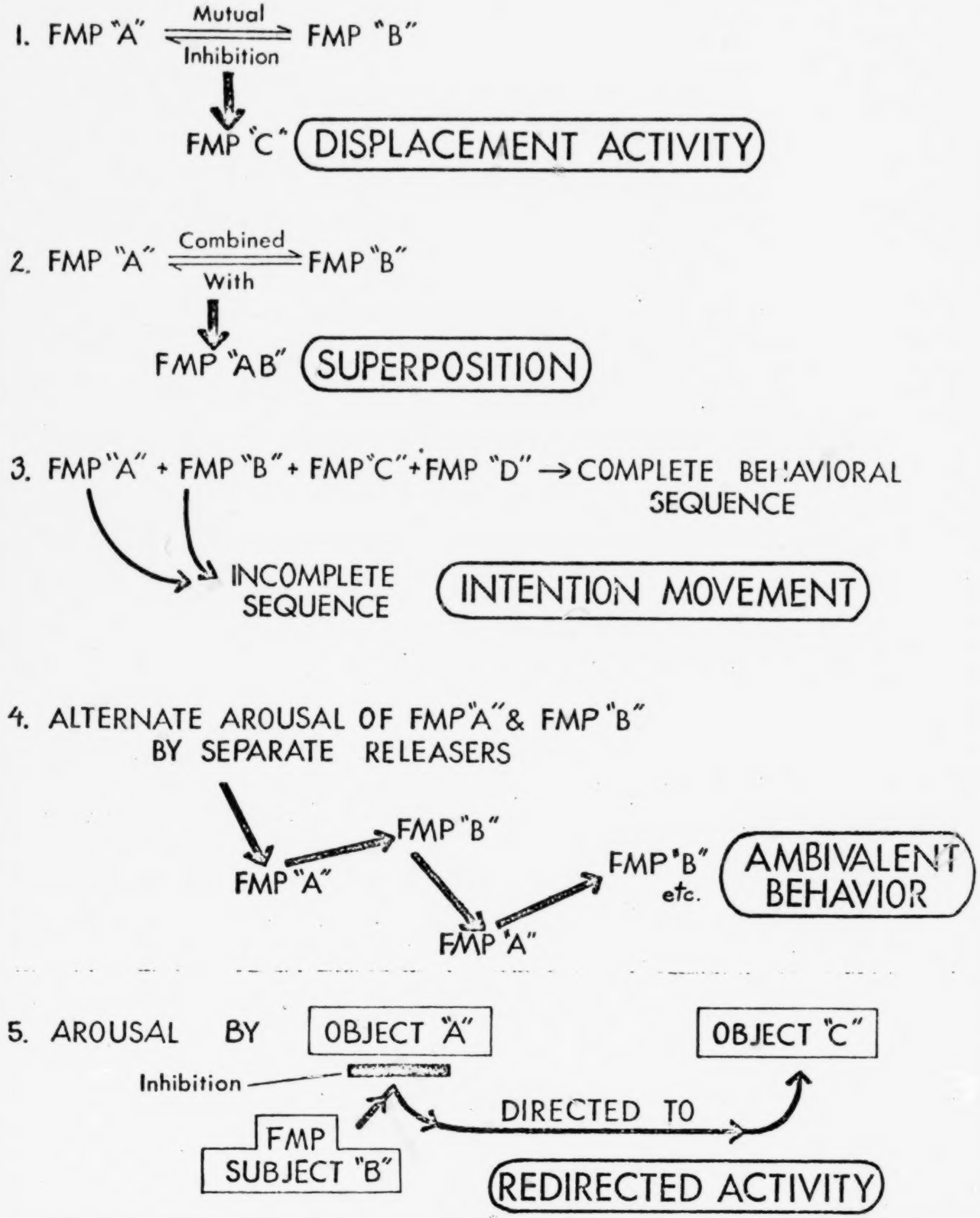
1. FMP "A"
Mutual
Inhibition
FMP "B"
FMP "C"
DISPLACEMENT ACTIVITY
2. FMP "A"
Combined
With
FMP "B"
FMP "AB"
SUPERPOSITION
3. FMP "A" + FMP "B" + FMP "C" + FMP "D" → COMPLETE BEHAVIORAL SEQUENCE
INCOMPLETE SEQUENCE
INTENTION MOVEMENT
4. ALTERNATE AROUSAL OF FMP "A" & FMP "B" BY SEPARATE RELEASERS
FMP "A"
FMP "B"
FMP "A"
FMP "B" etc.
AMBIVALENT BEHAVIOR
5. AROUSAL BY
OBJECT "A"
Inhibition
FMP SUBJECT "B"
DIRECTED TO
OBJECT "C"
REDIRECTED ACTIVITY

Figure 1

action chain. A bird may be seen to bend its legs, stretch its neck or flutter its wings (all of which represent movements initiating the normal pattern of flight), without leaving the ground, thereby indicating an intent, or incomplete impulse to fly.

e) In addition to the above, fixed motor patterns may be the subject of regressive behavior, a reactivation of motor patterns normally associated with an earlier developmental period, as when the motor patterns of begging food and feeding are utilized in the adult courtship of herring gulls. Another phenomenon observed in varied species of animals with a social hierarchy or dominance rank order is redirected activity, in which a lower ranking animal in an established hierarchy directs its aggressivity not at the higher ranking animal which aroused it, but at a lower ranking animal which happens to be nearby. One frequently finds that a given motor pattern initiates two different behavioral sequences. As a transitional activity to either feeding or bathing, the motor pattern of dipping the head under water in the midst of bathing carried out by shellducks, may result in a momentary bout of feeding. Stimuli from vegetation serving as food may contribute to this momentary feeding, even though the animal is obviously in a "bathing mood."

7. In addition to the above behavioral phenomena, imprinting (19), (20) which deals with rapid and frequently irreversible learning during an early critical period of behavioral development, has been reported in fish, birds and mammals and undoubtedly plays a significant role in the ontogenetic development of human behavior. (21) There may be two types of imprinting phenomena, as Schutz (22) has shown to occur in Mallard ducks - a parental recognition type of imprinting,

and sexual imprinting - the latter requiring a longer time to develop, but also occurring in the first two to three months in the life of a male duckling. *Bonding behavior*, including *mother-infant bonding* and *reproductive adult bonding* has been studied ethologically in a variety of animal species, with the result that we are gaining insight into the behavioral factors that result in strongly bonded relationship among animals.

These ethological concepts may be covered in a 2-3 hour lecture and demonstration. No amount of talking about animal behavior to medical students, however, can be as effective as several demonstrations of actual behavioral phenomena. In this realm particularly, an effective demonstration of behavioral principles is worth a thousand words. The utilization of a Comparative Behavior Laboratory in association with or in close proximity to the medical school is almost a prerequisite for such demonstrations. A certain degree of improvisation, however, is also possible. During a five week Visiting Professorship at the University of Florida Medical School in 1963, I was able to purchase pairs of four species of finches from a local five and ten cent store, and half a dozen, day-old Pekin and Muscovy ducklings. Within three weeks it was possible to provide demonstrations of the rank order of bathing, the homology of bathing and preening motor patterns in the several species, imprinting in the ducklings and the innate aspects of bathing and preening movements the first time the ducklings were permitted in the water. Such demonstrations not only raise questions about the neural substrate of such behaviors, but arouse considerable interest and enthusiasm, even among medical students little disposed to take any interests in animals other than man.

Slides and films are another important adjunct to such lectures. In addition to several commercial films, a variety of animal behavior films may be rented or purchased from the Animal Behavior Film Laboratory of the Pennsylvania State University in College Park, and the Max-Planck-Institut fur Film und Bild, Gottingen, Germany. A behavioral film library is also available at the Rockefeller Foundation in New York.

The material selected for presentation should (1) provide a background of biological concepts and principles utilized in the study of behavior such as the specificity of behavior patterns in species and other taxonomic groups of animals, the genetic, phylogenetic and ontogenetic aspects of behavior, and the lawful phenomena associated with fixed motor patterns, and (2) point out ethological considerations relevant to clinical problems and issues in medicine. For example, Gunther (23) has shown that the correct positioning of "an elongated nipple and anterior breast area in the posterior of the infant's mouth acts as a strong releaser for vigorous sucking." Some follow-up studies suggest that low intensity sucking experiences during the first months of life may be continued as an apathetic response to food and feeding activities during subsequent years of childhood. Blauvelt and McKenna (24) have shown that without prior instruction primiparous mothers will orient their newborn infants in a typically primate, belly-to-belly position. This position is conducive to the initiation of side-to-side rooting movements by the infant, which signals the mother that her offspring is ready to feed. Such interaction is the beginning of an important non-verbal dialogue between mother and infant, conducive to developing the mother's confidence in the relationship with her child. This can lead to a fruitful discussion regarding the effects of hospital routine and nursing procedures which often interfere with or postpone the development of this relationship during the mother's stay in hospital.

The earlier comment about the lack of an evolutionary perspective in the traditional neurophysiology or neural science curriculum is in no way meant to disparage the valuable and unique contributions which neurophysiology has made to medicine. It was meant to emphasize the fact that the approach of ethology which concentrates on behavior patterns is capable of providing biologic insights equally as important as those of neurophysiology which centers its research and thinking on the motoneuron. All too often, when the medical student's training in behavior is derived exclusively from a neurophysiological curriculum, he receives a one-sided and unbalanced background which leaves him incapable of thinking about the biology of behavior in all its ramifications.

Movement patterns constitute a fundamental biologic aspect of both human and animal behavior in much the same way that cells are fundamental units of animal structure. Even before Darwin's volume on expression, and before ethologists emphasized their significance, the French physiologist and anatomist Duchenne (25) (1967) completed a functional analysis of the entire muscular system of man as well as supplementary studies with animals, and concluded that the "isolated action of the muscle is not in the nature of things." Even a simple reflex does not result in the contraction of a particular muscle, but in the performance of a significant movement. Hughlings-Jackson (26) (1882) likewise concluded that nerve centers represent movement patterns, not muscles. We are in fact unable to move individual muscles, but we perform complex coordinations of muscles instantly. In this context, the significance of a phylogenetic and ontogenetic understanding of the maturation of movement patterns for the work of the physical therapist, the physiatrist, or in the treatment of the cerebral palsied child may be profitably discussed.

PRENATAL ORIGINS OF VERTEBRATE AND HUMAN BEHAVIOR

Studies dealing with the embryological origins of behavior are essential if medical students are to understand and deal with the maturational aspects of behavior. In addition, however, such embryological studies provide additional support for the genetic origin of much of behavior. Underlying the concept of the fixed motor pattern of ethology is the assumption that there is not only a genetically determined pattern of neural impulses emanating from the central nervous system, but also a genetically determined neural organization which provides these behavior patterns with their specificity. The subject has been extensively reviewed by the psychologist Carmichael, (27) who recognized the importance of an understanding of the early development of behavior patterns for psychological theory, as did the pediatrician Gesell. (28) Just as the functioning of behavior patterns is essential to balance neurophysiological theory based on the motor unit, so the embryological maturation of behavior patterns is required to counter the exclusive reliance of so many psychologists and behavioral scientists on learning theory. This subject will be discussed more fully in a later section of this paper.

Much of the impetus for today's understanding of the development of inherited behavior patterns is derived from the studies of the anatomist Coghill, (29) who possessed a curious psychological bent. "How does it come about?" Coghill asked, "that as soon as the larval salamander hatches from its egg, it is at once capable of those neuromuscular coordinations we term swimming behavior?" By carefully observing and filming the sequences of movement patterns that occurred in the transparent egg of the tiger salamander, and correlating these sequences with the histological study of the maturation of neurons, muscle bundles and neuromuscular functions, Coghill was able to demonstrate that the sequence of movements which gave rise to swimming was entirely dependent on growth and maturation processes in the embryo. Carmichael (30) demonstrated subsequently that if the embryos developed in the presence of the anesthetic chloretone, which did not interfere with development but prevented the earlier behavioral movements, they still swam normally when the drugged embryos were placed in fresh water at the proper stage of their development.

As the result of these studies on the maturation of behavior Coghill formulated two hypotheses which are seldom discussed, but which continue to possess relevance for both the evolution of behavior and certain developmental behavior anomalies, Coghill found that early in development any sensory input or stimulation capable of being conveyed to the developing central nervous system excites the entire nervous system and existing neuromuscular functions, resulting in what he termed a total pattern of response. During subsequent phases of maturation central inhibitory mechanisms develop which limit the total pattern and give rise to local responses. When the salamander develops legs it begins to walk with the total trunk pattern associated with swimming, then gradually the trunk pattern is inhibited and the legs appear to function autonomously, independent of the trunk, (i.e. the trunk action is inhibited and it is left with the limb pattern). Through a similar process of individuation, local reflexes develop within individual limbs. Note that in this early maturational schema reflex behavior comes about through the operation of central inhibitory mechanisms on the remaining nervous system, rather than through the initial building up of simple reflexes into more complex patterns of behavior. In view of Sherrington's (31) early recognition of the existence of some type of inhibitory mechanism in the central nervous system, and Eccles (32) more recent demonstrations of postsynaptic inhibitory neurons acting on motoneurons in various portions of the

CNS, the demonstration of maturational inhibitory mechanisms on the molar level by Coghill should be of more than passing interest. They suggest the behavioral adaptations which led to the evolution and incorporation of inhibitory mechanisms into the central nervous system.

Since the above studies, students (33), (34) of Coghill and others (35), (36) have demonstrated similar sequences of behavioral development in the embryos of other amphibians, reptiles, birds and mammals. Hooker (37) has carried out an exemplary study of the sequential development of behavior in the human fetus. He pointed out that since vertebrate embryos in general develop structurally in phylogenetically determined and regulated sequences, it would be surprising if the fetus failed to show similar sequences of behavioral maturation. Not all students of behavior developme have agreed with Coghill and Hooker's interpretations. (38) Kuo, (39) for example, in presenting an epigenetic view of prenatal behavior development in mammals and man, suggests that we not confuse species-specific structures with species-specific behavior patterns. While Kuo recognizes genetic influences on morphogenesis, he stresses the importance of environmental factors in the development of the individual behavioral repertoire. While it must be admitted that the environment is capable of playing a decided role in the development of behavioral phenotypes, it is not less capable of creating structural phenotypes, an extreme example of which might be the thalidomide babies and other teratologic anomalies. It is doubtful that Kuo would reason that since the environment can produce structural phenotypes, genetic factors for morphogenesis are nonexistent. His reasoning, therefore, appears to be an artificial and biologically indefensible endeavor to consider the development of structure and behavior from two separate viewpoints.

These differences in the interpretation of behavioral development, notwithstanding, medical students should be familiarized with the fact that the human embryo and fetus displays a relatively stereotyped sequence of behavioral development. Until about 6 1/2 weeks of menstrual age the human embryo appears to be incapable of any reflex activity. At 6 1/2 - 7 weeks of age, it responds with a typical contralateral flexion of the neck and uppermost trunk to light stroking of the upper and lower lip. At 8 1/2 weeks of age this response is followed by extension of the arms at the shoulder, and rotation of the pelvis toward the contralateral side. Spontaneously executed movements of the above type first to one side and then the other, are seen to occur in the 9 - 9 1/2 week old fetus. At 10 1/2 weeks, the palm of the hand first responds to light stroking, with partial closure of the fingers, plantar flexion of the toes in response to stroking of the side of the foot. At 11 weeks, trunk extension either alternates with or is partially combined with lateral flexion; at 11 1/2 weeks quick, kick-like extension of the knee occurs. At 12 - 12 1/2 weeks of menstrual age a "total pattern of response" occurs involving a wide variety of movements, but partially fades after 12 1/2 weeks of age. Thereafter more and more "partial patterns" or localized reflexes begin to make their appearance. Grasping, respiratory movements, phonation and sucking appear later in development.

Apart from their demonstration of the prenatal human behavioral repertoire, Hooker's studies deserve consideration for several other reasons. Of the 131 human fetuses made available to him, 14 failed to show responses because of deep anesthesia or injury, while the responses of another 31 were so reduced or modified by the administration of anesthetic or hypnotic drugs to the mother that their behavior, even in the fetal stage, was already considered abnormal and therefore eliminated from the study! Desmond, et al, (40) have indicated that anesthesia and analgesia administered to the mother in labor can affect the temporal sequence of the events of the infant's postnatal transition period in the first six hours of its life, and even influence the time of meconium passage. Disturbance of this pattern which occurs in the first few days of life may remain as a correlate of behavior and disease throughout the subsequent lifetime of the individual. Obstetricians, pediatricians and others have written about this subject with growing concern.

Another reason for considering these fetal behavioral responses is that they indicate the occurrence of lawful behavioral responses within the central nervous system, which can in no way be considered as due to learning. The fetuses which Hooker obtained were examined in carefully regulated constant temperature baths of physiological saline solution, or chambers under oxygen pressure. Nevertheless, all fetuses suffer from progressive hypoxia and eventual asphyxia. It was noted above that by 13 1/2 to 14 weeks fetuses have advanced to specific reflexes, or partial patterns of response to stimulation. But just before asphyxia sets in and activity is eliminated altogether, the 13 1/2 week old fetus tends to return or regress to the 12 - 12 1/2 week total pattern of response.

At 18 1/2 weeks, weak chest contractions, later accompanied by abdominal contractions and expansions indicative of diaphragmatic activity, begin to appear either spontaneously, or in response to stimulation. Nevertheless, Hooker has observed that when gasping occurs as a terminal agonal phenomena in the 13 week old fetus, it is accompanied by chest contractions indicative of respiratory movements, even though they are physiologically ineffectual. Initiation of chest respiratory movements which ordinarily would not occur until some 5 - 5 1/2 weeks later further suggests the existence of lawful interactions of different neuromuscular patterns within the central nervous system itself, independent of learning.

Furthermore, it has become evident that all the vertebrate respiratory patterns exist within the central nervous system of man - not only the fish-like pattern of gasping. A gasp is the first breath of a newborn infant, and among the stimuli that have been implicated in iniating this response, asphyxia is considered to be the principle driving force (just as a fall in arterial oxygen tension and pH, together with a rise in carbon dioxide tension induce gasping in utero). Normal newborn infants have a typically mammalian type of abdominal respiration. In 6 month old infants there is a gradual development of thoracic respiration which becomes deeper and slower, until typical pneumotaxic respiration predominates in the 7 year old child. In the course of phylogenesis, typical higher mammalian respiratory patterns gradually superseded the different partial centers found in lower vertebrates. During human ontogeny, respiratory development follows the general phylogenetic pattern. In the infant these centers appear to be quite labile, and immature patterns of respiration may take over during stress, disturbance, or anxiety. Premature and mature infants about to die, apparently "regress" to the lower form of gasping respiration prior to suffocation. Gasping and the swallowing respiratory pattern of amphibians are frequently seen as "symptoms" of various severe illnesses, especially pneumonia.

According to the pediatric neurologist Peiper, these phenomena represent regression to ontogenetically earlier, and phylogenetically "lower" stages of respiration, still present in the central nervous system of man and released from the inhibiting control and domination of the more recently developed respiratory centers. There is no better way of demonstrating to medical students that the term "regression," commonly used as a descriptive term in psychology and psychiatry, is as much a physiological event. Crying, screaming, laughing, sucking, separation from the mother, and anxiety all influence the pattern of respiration. Eventually these altered respiratory patterns influence growth and posture. I have seen two and even four year old children whose relationship with mother or parents was so disturbed that they were thrown into spastic respirations so severe as to be mistaken for symptoms of cerebral palsy. The psychoanalyst Bell (41) has suggested that the postpartum respiratory difficulties may be reactivated by stressful experiences during severe toilet training and other phases of development - and that the repetitive arousal of these initial respiratory spasms might well provide the background for asthmatic disturbances. Indeed, Erikson (42) appropriately referred to the first stage of human development as the oral-respiratory-sensory stage.

Studies of the embryology of behavior, therefore, can provide much fruitful material for discussions of (1) the maturation of behavior, (2) the lawful interactions and responses of behavior within the central nervous system, independent of learning, (3) the relation of metabolism and behavior, (4) the concept of "regression" as the reactivation of motor patterns and responses associated with an earlier ontogenetic phase of development, and (5) the relation of the modification of early patterns of response to later psychosomatic and psychosocial disturbances.

In this connection it would also be appropriate to utilize the studies of neurembryologists on the neural organization of the central nervous system. Sperry, (43) for example, in reviewing the subject of the embryological determination of behavior sums the matter up as follows:

"The development of behavior is directly dependent upon an orderly assembling of the neurons of the nervous system into appropriate patterns of interconnections .... In the course of growth, sensori-neuro-motor associations are somehow laid down in a consistent orderly manner. How are such patterns organized in development? .... a survey of the evidence as it now stands leads to the conclusion that the basic patterns of synaptic association throughout the vertebrate system are organized for the most part by intrinsic forces of development without the aid of learning."

THE POSTNATAL, NEUROMUSCULAR MATURATION OF INFANT AND CHILD

A sequential development and maturation of reflexes occurs postnatally, as well as prenatally, in the human infant. These are normally utilized for the evaluation, diagnosis and treatment of children with central nervous dysfunctions (Fay) (44), (45) (Bobath and Bobath) (46), (47) and (Fiorentino) (48).

Fiorentino has classified these reflexes as roughly belonging to three levels of central nervous system maturation as follows:

1) Apedal - with a predominance of primitive spinal and brain stem reflexes reflecting the motor development of a prone or supine-lying creature.

2) Quadrupedal - with a predominance of righting reactions belonging to the mid-brain, and the motor development of a child who can right himself, turn over, and assume crawling and sitting positions, and

3) Bipedal - with the development of a cortical level of control, and the equilibrium reactions of the child who can assume the standing position and walk.

The above classifications represent rough descriptive levels, rather than sharply defined categories. Furthermore, many of these primitive reflexes are present only for brief periods of early development, after which time they can no longer be elicited. Thus, flexor withdrawal of the leg upon stimulation of the sole of the foot of an infant is a normal spinal reflex up to approximately two months of age, but if displaced appreciably beyond this age may be an indication of delayed reflexive maturation. The same is true for other spinal reflexes, such as extensor, and crossed extension of the leg upon appropriate stimulation. It has been demonstrated in various vertebrates that when the brain is separated from the spinal cord these reflexes continue to be displayed. Consequently, they are considered to be spinal in origin.

Brain stem reflexes effect changes in the distribution of muscle tone associated with posture, and occur in response to a change in the position of the head or body in space. They can be elicited in the normal child during the first four to six months of life. When they persist beyond the first six months, this may also be indicative of delayed maturation of the central nervous system.

Righting reactions, mediated by the midbrain level and associated with quadrupedal locomotion, result in the establishment of the normal head and body relationship, both in space and in relation to each other. They develop soon after birth, and are involved in such activities as rolling over (the neuromuscular pattern for which is already present, in part, in the fetus), in sitting up, in getting on hands and knees and crawling, or in quadrupedal locomotion. These reflexes exert a maximal influence from 10-12 months of age. Thereafter, they are gradually inhibited or modified, and disappear towards the end of the fifth year.

Apart from their utility for diagnostic purposes, this sequence of reflexive maturation has important biological and neurophysiological implications for the growth and development of the child. First, these reflexes are unlearned - many of them have already been established during prenatal development. Second, they become functional and normally inhibited in a relatively orderly sequence, and their functioning in this sequence may be a requirement for the further growth, maturation and integration of the nervous system itself. Where brain damage, or lesions, prevent the inhibiting action of other "higher" centers, these primitive reflexes and distributions of muscle tone may continue to dominate and interfere with normal behavior and development, as in the cerebral palsied child. Most important, from a theoretical viewpoint, these reflexes which appear and disappear during ontogeny are another indication of the presence of phylogenetically old vertebrate neuromuscular coordinations in the central nervous system of man.

In addition to the ontogeny of respiratory patterns, of spinal, brain-stem and mid-brain reflexes, and cortical, inhibitory control mechanisms, the ontogeny of locomotion also appears to follow a phylogenetic pattern of development. Swimming is undoubtedly the oldest vertebrate method of locomotion. McGraw (49) has demonstrated, on the basis of 445 filmed observations of the aquatic behavior of 42 infants, ranging in age from 11 days to 2 1/2 years, that the swimming pattern is a normal and regular behavioral response of the newborn infant. There is an initial phase of reflex swimming which occurs and gradually fades out over the first 3-4 months of age. This is followed by a period of disorganized, or struggling activity which reaches a peak at about 6 months of age. Voluntary swimming makes its appearance at seven months of age and reaches a moderately good level at 12-14 months of age. In this connection it is interesting to point out that the month-old, embryo-like offspring of marsupials, which have been observed to make their way unaided from the vaginal orifice to the marsupial pouch, utilize a side-to-side, swimming motion of the trunk to achieve their goal.

Between birth and approximately one year of age, the infant goes through a development of various movements which permit him to roll over from his back to a prone position. Within a few weeks after birth he extends his neck, then eventually his entire trunk, and after some 3-6 months automatically completes an entire turning movement, but without specific purpose. From 6-12 months of age he utilizes turning over to the prone position in a deliberate fashion as the preliminary to some other activity, such as creeping or standing up. It should be pointed out that Hooker's studies already reveal the presence of these movement forms in the central nervous system of the human fetus.

Once in a prone position, the infant develops an orderly progression of movements from creeping and crawling to walking on all fours, and finally, bipedal locomotion. Creeping, in which the arms alone are used, and the abdomen is dragged along, is often a preliminary stage to crawling, especially when the arms are moved alternately instead of simultaneously. In crawling, the infant progresses with all four limbs in a pattern of crossed coordination -- i.e., the right arm and the left leg move together, then the left arm and the right leg. Crawling appears at 7 1/2 to 8 months of age.

Like swimming, quadrupedal locomotion, with the legs as well as the arms extended, is not seen frequently in young children, but it does occur with some regularity. I have observed an 11 1/2 month old boy walk on all fours with remarkable speed and proficiency, whenever the youngster wanted to keep up with or remain in the company of an older sister or his mother. In another instance a 13 1/2 month old boy who could both crawl and walk bipedally (he had been doing so for two weeks) returned to a quadrupedal gait whenever he wished to move quickly, since quadrupedal locomotion was his most rapid means of movement. He made a smooth transit from either crawling or dipedal walking to walking on all fours. The factors for the release of quadrupedal locomotion are not understood, but are being studied in our laboratory.

It is frequently claimed that infants will not walk bipedally unless there are adults in their environment that they can observe in this position. Certainly the ability to observe a form of locomotion does not play a role in the maturation of swimming, creeping, crawling or quadrupedal locomotion, since first born children with no opportunity to observe these movements in their environment nevertheless utilize all these forms of locomotion. Thus while children are imitative, there is no evidence that imitation is a factor in the development of locomotory sequences. Further, as is well known, newborn infants are capable of the basic neuromuscular coordinations of stepping, if they are held under the armpits and their feet touched to the walking surface. They will also show step-climbing movements. It is thus apparent that their central nervous systems already possess the neuromuscular coordinations of stepping along at birth, even though unable to support their bodies in an upright position at this time. These walking reflexes increase in incidence during the first two weeks of life, but disappear in normal children at 3 or 4 weeks of age. Furthermore some youngsters walk bipedally unaided the first time they attempt this form of locomotion. One mother, who had provided no aide of any kind in the maturation of his various forms of locomotion, reported that her 14 month old son who had never previously walked, suddenly stopped crawling, rose on two legs without pulling himself up on any nearby object and effectively walked some 3 1/2 to 4 yards toward her. It would appear that what is required for walking in children is the requisite muscle and bone development, together with the subsequent integration of the bipedal pattern with the erect postural pattern.

In addition to elicitation of the swimming and bipedal patterns at birth, it has been shown that newborn infants are capable of the support of their

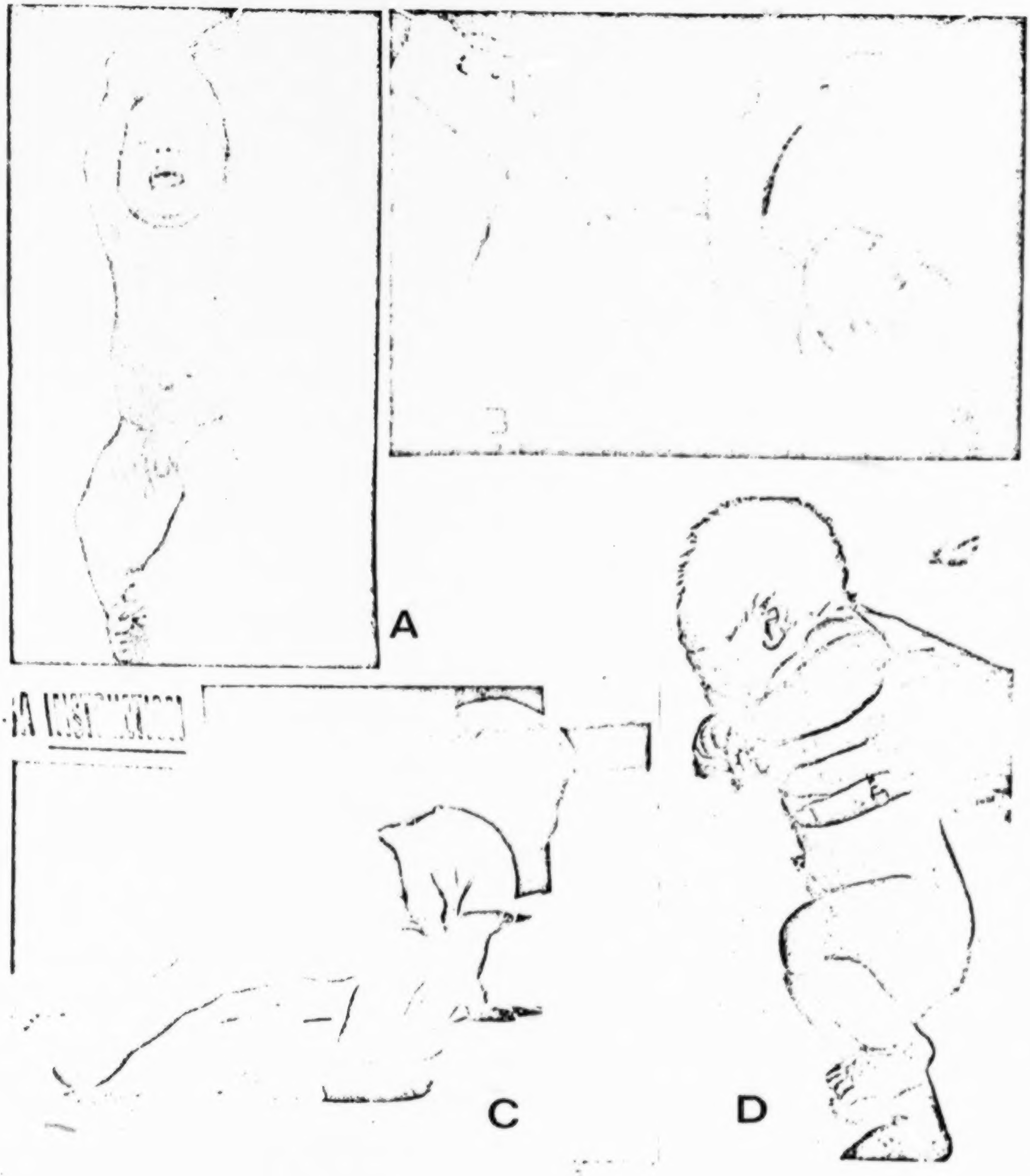

Figure 2. Fixed motor patterns of locomotion in the infant.
A. Primate clasping response (After Peiper, 1963)
B. Clasping with hands and feet (After Peiper, 1963)
C. Mammalian quadruped locomotion in a 13½ month old boy (Photograph by S. Kramer)
D. Bipedal walking pattern in a 6 day old girl.

bodies in primate fashion, by grasping and hanging from their hands, or utilizing their hands and toes (Figure 2). Likewise the movement pattern of crawling may be elicited as a reflex in all healthy newborn infants, if the infant is placed on his abdomen and continuous pressure is applied to the soles of his feet with the examiner's hands. Such reflex crawling also disappears by the fourth month of age, and cannot be prevented from disappearing by practice. It would appear that most of the neuromuscular coordinations of locomotion (1) are already present at birth; (2) that the development of locomotion in the child occurs in a regular sequence; and (3) that the ontogenetic sequence of locomotion reflects the phylogenetic development of locomotion in the vertebrates. Not only does the larval salamander (Ambystoma) develop a pattern of terrestral quadrupedal locomotion by first using the limbs in a swimming pattern, but man likewise attains bipedal locomotion after repeating, during early ontogeny, ancestral vertebrate patterns of locomotion as functional stages in the maturation of his central nervous system.

While the various organ systems, the circulatory, the respiratory, the excretory, the nervous system, etc. are presented in detail to the medical student, the evolutionary aspects of the neuromuscular system, and the role of behavior patterns in human development and in mediating all aspects of social behavior, is neglected in both the medical and behavioral science curricula. The occurrence and expression of such primitive and phylogenetically ancient neuromuscular coordinations during the course of ontogeny constitute part of the normal developmental sequences toward maturity. (50) Without consideration of this aspect of the "behavioral system," it is doubtful that an understanding of biosocial interrelations, so crucial to the development of a medical-behavioral science curriculum, will be attained.

NEUROMUSCULAR ASPECTS OF EMOTIONAL BEHAVIOR

The fact that we have so many different words, such as postnatal reflexes, behavior patterns, locomotion, manipulation, respiration, posture, attitudes, etc., prevent us from realizing that what all these terms have in common is the integrated activity of the neuromuscular system. This is particularly true with regard to any consideration of emotional behavior. While the approach of physiologists, psychologists and psychiatrists may differ in either their treatment or research in regard to the emotions, all will agree that no emotion occurs in the absence of neuromuscular and autonomic nervous system changes. This, in fact, provides the physiological basis for all so-called "lie-detector" tests. From a biological viewpoint, emotional responses are adaptive patterns of behavior and, as with other behavior patterns, can be understood from an evolutionary perspective. An excellent biological, evolutionary consideration of behavior has been outlined by Plutchik (1962) (51).

Beginning with the studies of Duchenne (1862) (52) and Darwin (1872) (53), we have accumulated considerable information about the neuromuscular components and expression of the emotions, their physiology (Cannon 1929, 1932), (54), (55) the role of the hypothalamus (Bard, 1934) (56), the neural substrates which mediate emotional behavior (Papez, 1937), (57), (Arnold, 1960), (58), and the role of the autonomic nervous system in emotion and emotional disturbances (Gellhorn and Loofbourrow, 1963) (59), etc. The problem is presenting the role of the emotions in health and disease to medical students, therefore, is not a lack of information, but the crucial questions of what information to select and how to organize a balanced presentation. Not only psychiatrists, but all future physicians will require an understanding of the role of the emotions in human development, the specific patterns of emotional behavior they will meet and deal with among their patients, the ways in which such individual patterns of emotional response can contribute to so-called organic illnesses, how to recognize emotional disorders, and the available resources required to deal with them.

The subject of emotional behavior then affords a unique opportunity for the medical curriculum to integrate the so-called hard and soft-core clinical areas of medicine. The usual practice of calling on the neurophysiologist to present the neural substrate of emotional responses, and the psychiatrist to separately present the developmental and subjective aspects of emotion, has seldom been effective. The medical student is thus invited to choose between, rather than integrate, the two models of emotion presented in this fashion. It is essential that staff members from the basic, clinical and behavioral sciences get together and work out an integrated model for presentation. However much the presentation of such an integrated concept of emotional behavior differs in the various medical schools, such effort will do more than anything to further the concept that an integrated understanding of emotional behavior is not only desirable, but essential in dealing with diverse clinical problems.

Many first year medical students are reluctant to deal with the emotional aspects of human behavior. Others, presumably those with a strong interest in psychiatry, are anxious to explore the subject further. On the other hand, all medical students have some awareness of certain areas of their own strong emotional responses, and wherever possible an endeavor should be made to relate the subject matter to their feelings. An integrated approach should cover the biological and physiological aspects of emotional expression in man and animals, the neural substrate of emotional behavior, the role of the emotions in infant and child development, emotion in family structure and stability, emotional responses of patients to illness, to treatment, to the physician, and psychosomatic interrelations in illness and emotional disorders (Reymert, 1950), (60). I have found the following schema a useful one:

A) Emphasize the evolutionary origin and the fundamentally adaptional aspects of emotional responses, as indicated by the early studies of W.B. Cannon. If man or an animal is engaged in strenuous activity, as in working or jogging, autonomic homeostatic mechanisms follow the behavior and serve to correct whatever depletion of resources the activity entails. In an emotional response, such as the fight-flight reaction of animals the sympathetic-adrenal portion of the autonomic reaction anticipates the energy expenditure that would be required to either escape a situation, or engage in a fight, leading to increased respiration and facilitation of other physiological aspects of respiratory processes, circulatory adjustments including heart acceleration, constriction of splanchnic blood vessels, discharge of extra red blood corpuscles from the spleen, breakdown of glycogen and release of glucose from the liver into the blood -- even setting in motion a mechanism for the reduction of blood coagulation time, should the situation result in a wounded animal. In other words, an emotional response in a potentially threatening situation leads to a total pattern of response, which has (a) a neuromuscular component (modifying the muscle groups that might be required for an aggressive or escape response, and activating the perceptual reflexes directing the sense organs towards the threatening object), and (b) an autonomic component which would support an ensuing behavioral activity. This approach provides an important connecting link between autonomically mediated homeostatic mechanisms and the capacity of emotional patterns to upset these functions.

B) Emphasize that all other vertebrate animal groups have similar "emotional" mechanisms. A fish, for example, will likewise respond to a threatening situation with a combined neuromuscular pattern - either escape swimming, or remaining perfectly still in a corner or near other cover - together with an autonomic nervous system response resulting in the "blanching" of the fish (due to concentration of pigment granules in the melanophore cells) - or it may assume a darkened pattern, together with erection of dorsal fins, expansion of gill covers, etc. preparatory to an aggressive response towards an intruder. We need not get lost in the problem of whether or not fish and other vertebrates "feel" emotions subjectively. What is important is that our own emotional responses have evolved from these combined neuromuscular and autonomic patterns of response found throughout the vertebrates.

C) Utilize Darwin's analysis of the neuromuscular components of emotional responses such as crying (present in the newborn infant) and how the inhibition of crying over a prolonged period of time leads to the expression of a new emotion - grief. Especially relevant is Darwin's indication that the suppression of crying requires the activity of the frontal muscles to counteract the contraction of the orbicular, pyramidal and corrugator muscles normally activated in the process of crying. This demonstrates two overlooked aspects of emotional expression, first that combinations of neuromuscular patterns (the superposition phenomena of ethologists) are capable of evolving into complex new or subtly modified nuances of emotional expression, and second, that the inhibition of emotional expression - an aspect of the development of all infants and children - requires the activation of counteracting neuromuscular responses. This is an all too often completely overlooked, but important physiological aspect of emotional expression. The particular pattern of emotional suppression which each child goes through results in that child's pattern of body (neuromuscular) tension later in life.

Huber's (60) excellent treatise on the evolution of the facial musculature, and expression, may be brought into the lecture to indicate how portions of the neck musculature of reptiles gradually spread over the head and face of mammals, primates and men and led to the more refined movement of the perceptual organs (the eyes, ears and nostrils) and the mouth and lips. This constituted the primary function of the facial muscles. Once evolved, however, these muscles were secondarily drawn into their present signalling and communicating function as facial expressions. This is another opportunity to indicate how the evolution of structure and the evolution of behavior go hand in hand. Various ethological studies of the subtle combinations (superposition) of two separate facial expressions such as fear and aggression, have been delineated in dogs, cats and other mammals.

The intent of this section should be to demonstrate (1) that emotional patterns of response are present throughout the vertebrates from fish to man; (2) that emotions are essentially biologically adaptive, (3) that from an evolutionary viewpoint emotions appear to have had their origin in neuromuscular coordination of intended behavior together with an autonomic nervous system component designed to support the intended behavior; and (4) that although emotions may be considered or treated in a subjective context, that they always involve physiological consequences.

This is a good point at which to present experimental material on the neural substrate of emotion, including the studies of hypothalamic stimulation of animals in social situations by Delgado (61), the studies of sympathetic and para-sympathetic tuning of Gellhorn, the mechanism of emotion proposed by Papez (1937), Arnold (1968), and others. It should be emphasized that in all such animal studies, the determination of emotional responses rests on a knowledge of the special neuromuscular coordinations which characterize them, i.e., the arched back, open mouth and hissing of an angry cat, etc., as well as on the accompanying autonomic reactions.

This biological viewpoint that emotional response or behavior originates from a total pattern of integrated physiological response of a fundamentally adaptive nature, sets the scene for later consideration of the circumstances under which it is possible for adaptive patterns to become maladaptive, to contribute to the development or maintenance of organic illness, to interfere with the processes of convalescence, or to develop into emotional disorders.

THE ROLE OF EMOTION IN MATURATION AND DEVELOPMENT

While the biological, evolutionary and adaptive aspects of emotional responses provide us with background for understanding their physiological function, these considerations provide little understanding of the role of emotion in human development, and in the day to day interactions with friends, colleagues, business associates, family or patients. Queries put to first year medical students concerning such everyday terms as emotional development, emotional stability, emotional maturity, emotional disturbance or upset, emotional behavior, etc. usually reveal the variety of connotations, value judgments, and confusion that these terms engender. Very little clarification of this confusion accrues from presenting the neural substrate and physiology of emotion on the one hand, and the psychiatric picture of early emotional development, and psychotherapy, if no effort is made to connect these two areas of information. The connecting link resides in precisely what these two pictures of emotion both omit -- the actual behavior patterns through which infants, children and adults express their emotional reactions in day to day living. (Also see Jacobson, 1967), (62).

To counteract any notion that emotional responses are largely disruptive, it is useful to present Spitz's (63), (64) earlier studies on mortality in foundling homes and other institutions for children, together with his description of the syndrome of anaclitic depression. It is well to remind students that in the early part of this century many institutions for foundlings and orphans reported 90% or higher mortality rates, but Spitz found that even when conditions improved "institutionalized" children practically without exception developed subsequent psychiatric disturbances and became asocial, delinquent, feeble-minded or problem children. But apart from emphasizing the significance of human emotion in the interaction between mother and child, Spitz's paper deserves to be reread for its description of the neuromuscular aspects of the withdrawal pattern of the separated child.

Depression and other psychotic disturbances of adults are normally characterized by delusions, disturbances of thought processes, abnormal thought production and mental confusion. Spitz pointed out that in the infants suffering from anaclitic depression which he examined, the disturbances were to be detected primarily by postural changes, changes in mobility and behavior, and particularly in the facial expressions of emotion. It is through such behavioral changes, especially through the neuromuscular coordinations of locomotion, posture and expression, that this pathological process first makes itself known early in development. All 19 cases of anaclitic depression which he studied showed one factor in common -- the mother had been from the child for almost three months, between the ages of 6-8 months. A more recent clinical report indicates that in six cases of children hospitalized as the result of specific disturbances of maternal behavior and family organization (otherwise termed "maternal deprivation") a syndrome similar to Spitz's anaclitic depression was found which not only included retarded, psychomotor development, but severe growth retardation and delayed skeletal maturation. (65) This strongly suggests that what we term "depression" is not primarily a psychological response.

The recent studies by Spencer-Booth and Hinde (66), and Kaufman and Rosenblum (67), might well be introduced at this time. In two separate series of experiments wherein rhesus and pigtail monkeys were separated from their mothers, they undergo comparable responses of 1) initial distress, 2) decreased locomotion and behavioral activity, and 3) depression. Even when these infant monkeys were later reunited with their mothers, the effects of this depressed behavior continued for several months to a year later. This suggests that what we term a "depression" is basically a biological pattern of response of separated primates, and not necessarily a unique human "psychological" response.

Likewise, Sacket (68) has shown that early life experiences in rhesus monkeys also produce persistent effects on behavioral development. For example, rearing infant monkeys without physical peer contacts produces persistant and damaging abnormalities in non-social, social, sexual and maternal behaviors in later life. All attempts to reverse such pathological effects of early experience proved to be uniformly negative. If reversal is not possible, do these early experiences represent "learning" or are they incorporated into the growth process? According to him "isolation per se from critical early social and non-social experiences appears to produce permanent anomalies within the animal which persist regardless of the degree of adaptation to post-rearing test situations." He points out that the similarities in the motor patterns of abnormal man and abnormal monkeys suggest that the isolation-reared monkey is a valuable model for the development of abnormal behavior among primates in general.

It has been indicated that the developing infant and male child requires a continuing, and unbroken emotional relationship with his mother through approximately the third year of life (through the oedipal stage) for normal psychosexual development (69). What if the child, because of some early trauma in the second year of life, breaks the emotional relationship with his mother behaviorally -- i.e. he no longer interacts with her emotionally and behaviorally in a loving or aggressive fashion,but continues to fantasy a continuing love relationship? Is this the beginning of the development of an introverted, schizoid-type personality structure?

What if the mother dies in the third year of life, and the father takes over the mother's warm, loving role (instead of remaining as the powerful competitor with the son for his mother's love and affection). Does this lead to interference of normal identification with the father, and lead to the development of a strong, emotional, homosexual attachment to the father. And does this provide the psychosexual background for later physical and emotional homosexual relationships?

This is a good point at which to take up the normal psychosexual development of both infant girls and boys. Actual case histories, in which not merely theoretical constructs, but a knowledge of the actual early life cycle behavior patterns are known to a considerable degree, should be utilized. (70) In addition, studies of actual early behavior patterns in infancy and childhood should be introduced to indicate that the theoretical metapsychological constructs of psychoanalysis have their origin in observable behavior.

THE INTERRELATIONSHIP OF BEHAVIOR WITH OTHER PHYSIOLOGICAL PROCESSES

The amount of time devoted to neuroanatomical, neurophysiological, neuroendocrinological and the muscle biochemistry substrate of behavior in the curriculum is undoubtedly a factor in the one-sided viewpoint which so many medical students develop regarding what "causes" what. Little wonder that they become fixated on the molecular causes of illness and neglect the equally important behavioral regulation or disturbances of human physiology. In so many instances, the social, cultural or even the hospital or institutional environment does little to directly influence or change the organism's biochemistry, but by modifying behavior it is capable of bringing about far-reaching biochemical, physiological and even structural changes. Therefore specific clinical instances and case histories should be provided which emphasize the mutual ways in which behavior and physiology are inter-related.

A good starting point is the bed-rest patient (71), (72), (73). It has been shown that even when healthy medical students are put to bed, wasting of muscle tissue, leeching of bone calcium, and a decrease of blood volume, capillarity and other circulatory reductions begin very shortly. The normal nitrogen balance of the organism is upset, as detected by increased excretion of nitrogen in the urine within several days and this, regardless of how many steaks or other protein supplements these bed-confined medical students might eat. These changes in the bed-rest patient are therefore not the result of illness, but due to inactivity of the individual.

This remains one of the unsolved problems with which today's and future astronauts will have to cope, since in their case, as well, prolonged inactivity carries with it the hazard of physical deterioration.

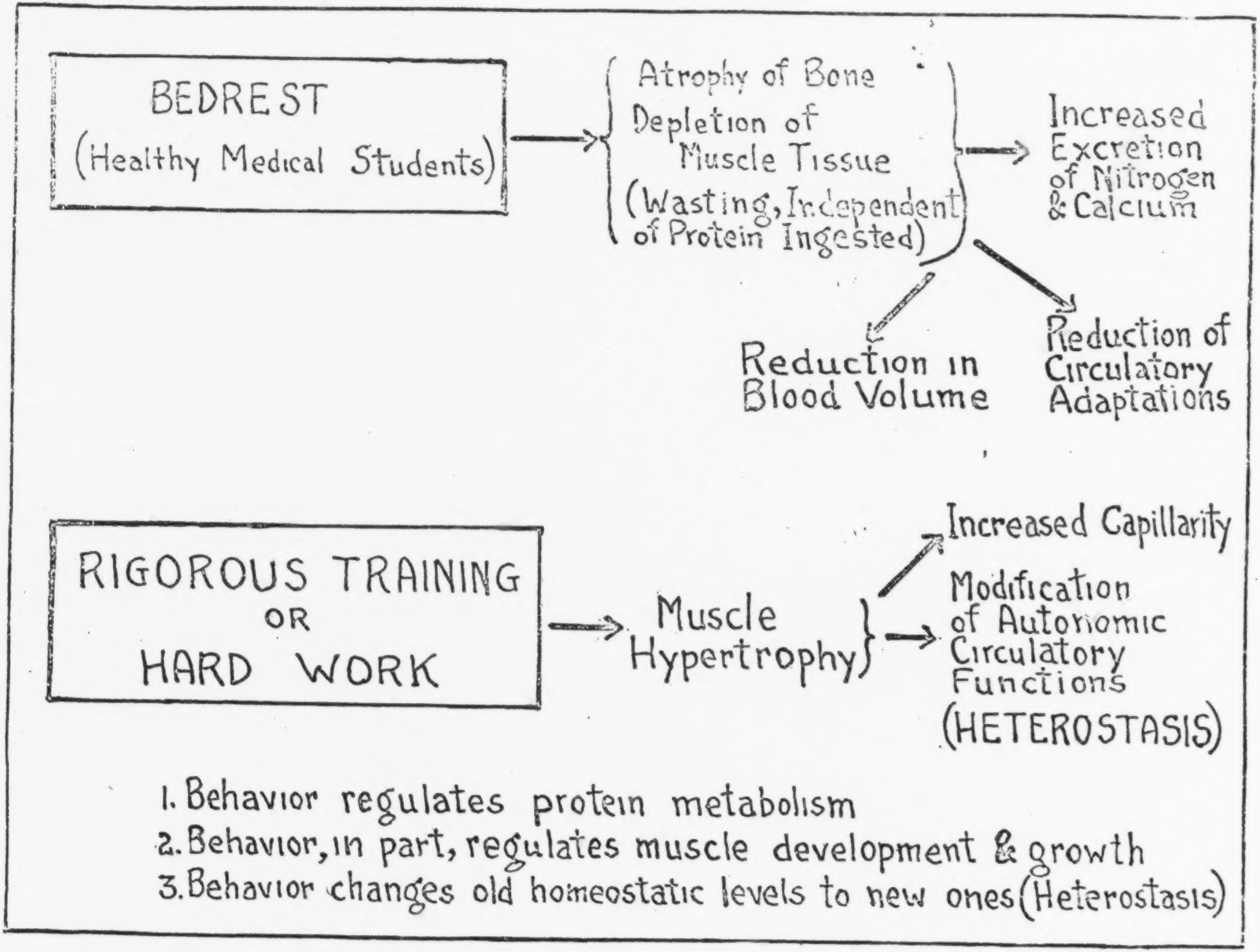
BEDREST
(Healthy Medical Students)
Atrophy of Bone
Depletion of Muscle Tissue
(Wasting, Independent of Protein Ingested)
Increased Excretion of Nitrogen & Calcium
Reduction in Blood Volume
Reduction of Circulatory Adaptations
RIGOROUS TRAINING OR HARD WORK
Muscle Hypertrophy
Increased Capillarity
Modification of Autonomic Circulatory Functions
(HETEROSTASIS)
1. Behavior regulates protein metabolism
2. Behavior, in part, regulates muscle development & growth
3. Behavior changes old homeostatic levels to new ones (Heterostasis)

Figure 3. The regulation of protein metabolism and structural changes mediated by behavior (After Kramer, 1969)

The biologist H.S. Jennings quite appropriately defined behavior as the method of regulating the internal processes by means of external movements. "To keep the internal processes going," he pointed out, "the animal must do certain outward things. Thus behavior and the internal processes are not two things; they are a unit and cannot be understood separately." As animals have adapted to their particular environments and modes of life, patterns of behavior have evolved and have been "wired in" to the nervous system, thus providing a regulatory role for numerous physiological, biochemical and autonomic functions.

An opposite response from that of the inactive, bed-rest patient is exemplified by the athlete in training. When an individual engages in running, swimming, or other vigorous exercise, an immediate physiological adaptation takes place. The tremendously increased energy expenditure involves respiratory, circulatory and other adaptations, so that almost a twenty-fold increase in the volume of blood flowing through the muscular system may take place during maximal exercise, together with corresponding changes in pulse rate and stroke volume of the heart. As is well known, these changes are largely mediated by respiratory and cardiac centers in the medulla acting through the autonomic nervous system.

What we term "training", however, involves several distinct but integrated processes. These include, of course, both the performance of the particular neuromotor activities involved, and the special skill with which the partial motor patterns are put together to bring about the end result. Secondly, there is a transition from the normal, relative resting state of the autonomic nervous system, to the very different autonomic pattern associated with the athletic activity. Jokl (74) refers to this transition as a change from homeostasis to **heterostasis**. Homeostasis relates to the tendency of the organism to maintain a constant inner environment during normal non-athletic activity, whereas during exercise, pulse rate, blood rate, body temperature, blood sugar, muscle tone and oxygen intake and utilization undergo a marked "heterostatic" change.

The remarkable effect of training, however, is that over an extended period of time, such exercise brings about deep-seated structural changes in the body of the athlete. Through training the neuromotor patterns and the new autonomic patterns are integrated, or to be more accurate, they are "grown" together. The amount of myoglobin in the muscle, which acts as an oxygen reservoir, increases. The muscles themselves increase in size, the capillary blood vessel bed in the muscles is enlarged, the volume of the blood increases, and structural changes occur in the heart itself. Not only his skill, but these changes in the structure of the body of the trained athlete provide him with the necessary endurance power required for an outstanding performance.

The fact that behavior and growth, or structural modification are intimately related has not been lost on swimming coaches, so that athletic activity and the training of athletes is now begun earlier and earlier, while active growth is going on. This undoubtedly accounts in considerable measure for the fact that world swimming champions are 14, 15 and 16 years old, and that athletic records have continually improved over the last several decades. While this capacity for growth is greatest during the first two decades of life, it never ceases, with the result that training and exercise programs are now being utilized in cardiology to treat 40-60 year old patients who have suffered myocardial infarcts.

These examples emphasize the unique capacity of behavior to bring about changes in physiological function and structural modification. The rationale behind the training program for cardiac patients resides, in part, in the modification of peripheral circulatory mechanism which such training brings about. But although these instances of the ability of behavior to initiate physiological change are well documented, they are thought of as exceptional instances, rather than representing end-points of a continuum of relationships between behavior, physiology and growth.

The afferent pathways initiating complex neuroendocrine functions may be triggered by behavioral activities. (Scharrer and Scharrer, 1963) (75). Thus, the presence of a strange male in a female mouse's territory may introduce olfactory stimuli which depresses the secretion of prolactin and results in blocking of pregnancy. Copulatory behavior, which appears to involve afferent impulses from a multitude of receptors, initiates ovulation in rabbits and cats. Copulatory behavior in the rabbit apparently also leads to reflex liberation of oxytocic substances from the neurohypophysis, since stimulation of the vulva, vagina and cervix of rabbits produces active movement of the reproductive tract, which in turn speeds up the transit of sperm to the Fallopian tubes. Lehrman (76), (1958 a,b) studies the effects of courtship and nest-building behavior on the induction of broodiness (egg-incubation) in the ring dove, Streptopelia risoria. His experiments led him to suggest that courtship behavior of the male stimulates estrogen secretion in the female, and that estrogen stimulates nest-building behavior, which in turn encourages progesterone secretion which stimulates incubation behavior. While the hormones play a role in influencing the readiness of these doves to behave in a particular fashion, the fixed motor patterns of these various behaviors are unlearned.

Likewise, in woman an infant suckling at the breast, and the frequent removal of accumulated milk, influences the amount of milk produced. Suckling leads to a reflex increase in the secretion of prolactin; accumulated milk removal to the liberation of oxytocin (77). The latter hormone, also influenced by suckling, plays a role in the free flow of milk called "let down." These and similar biobehavioral phenomena require emphasis if medical students are to gain an understanding of the neglected concept that behavior influences physiological processes in a variety of ways. (See also Beach, 1948) (78).

THE SHARED HOMEOSTATIC AND HETEROSTATIC FUNCTIONS OF BEHAVIOR AND THE AUTONOMIC NERVOUS SYSTEM

The above material, which can be covered in 12-14 hours of class lectures, should provide medical students with the realization that at the very least periods of sleep, rest, moderate or strenuous activity, and emotional behavior all involve changes in both neuromuscular and autonomic nervous system activity. This provides the groundwork for the fact that the autonomic functions of the various activities may conflict with each other, support each other, or summate in a fashion which leads to pathology. The following material may be taken as illustrations; other examples can be utilized as well to start medical students thinking along these lines.

The homeostatic mechanism which shifts a considerable volume of blood to the intestinal tract following a meal may conflict with the mechanism that shifts blood to the peripheral circulation during moderate or vigorous activity. Thus, if a heavy meal is abruptly followed by strenuous swimming in an untrained individual, muscle cramps may result from the inability of the organism to adequately meet both needs. Likewise, an emotional response may either conflict with the blood volume shift to the internal organs or augment an autonomic response to either the physical environment or to pathogenic microorganisms. (79a), (79b).

A case in point is a study of Hinkle (79) who has carried out some thorough investigations of human ecology during the past 20 years. Following the studies of Holmes (80) and others, who demonstrated that the nasal mucosa not only responds with a reaction of engorgement and nasal secretion to a wide variety of noxious and threatening stimuli but also to the emotional responses of crying or even feelings of sadness, Hinkle undertook a study on the effect of such responses in acute respiratory illnesses. He carefully selected a group of 24 women from over a thousand who worked in two large rooms in an office building in New York City and followed them carefully over the course of an entire winter, with observations of their general health, their nasal symptoms, the color and secretion of their nasal mucosa, clinical signs of respiratory illnesses, viral and bacterial cultures of their noses and throats, observations of their social background, and their general moods and behavior during the daily rounds of their work and home life. Needless to say, such an investigation required a unique collaboration of physicians, epidemiologists, virologists, bacteriologists, sociologists, and clinical psychologists. According to Hinkle this study "produced evidence that the nasal secretion which is referred to as 'common cold' occurred among these women most frequently and in its most florid form, at times when their nasal mucosa were already engorged for other reasons. In the winter, differences in the temperature of ambient air, between indoors and outdoors, appeared to be an important reason for this; but a more important reason appeared to be changes in the mood and pattern of activity of the woman, in response to changing relationships to people around her and the events which she encountered. Apparently viral infection of the nasal mucosa of a woman, sad, tearful and fatigued, often produced florid illnesses; while infection of another woman, well rested and not aroused, produced little or no illness."

Ecologically speaking, responses to the social or interpersonal environment are not fundamentally different from responses to the physical environment, or to internal responses of the organism to invasion by noxious organisms or substances. Relevant to medicine is the fact that these responses involve, in part, the same physiological systems, and sometimes near identical mechanisms of reaction.

Furthermore, just as the athlete in training may shift from homeostasis to heterostasis in regard to the activities of the autonomic nervous system, so the individual may shift the normal balance of central (hypothalamic) autonomic reactivity, to one which favors either a more vigorous sympathetic or parasympathetic response. Gellhorn (81) refers to such alterations as sympathetic or parasympathetic "tuning." The external environment, emotional reactions, drugs or other conditions may lead to increased sympathetic discharges and central sympathetic tuning. During such a state of sympathetic tuning, the response of the parasympathetic division of the autonomic nervous system to stimulation becomes reduced. Likewise, sympathetic excitability to stimulation is reduced during parasympathetic tuning. Chronic, or permanent pathological changes may result, if alterations of this kind persist long enough. Instead of working towards a balance, sympathetic or parasympathetic responses may dominate an individual.

Claude Bernard (1859) first described the internal steady state mechanisms which permit mammals to live and thrive under widely varying external conditions. Cannon confirmed and extended this concept which he termed homeostasis. He also pointed out that the steady state is not a rigid one, but relative - the steady state itself is subject to change. Thus the homeostatic mechanisms vary considerably during the rapid growth of the fetus, the infant and the child, and again during maturity, middle and old age. There are fluctuations of the steady state due to seasonal or geographic changes, or to special conditions such as pregnancy and lactation. In other words, homeostasis itself is a dynamic system, changing with time, activity and environmental conditions.

The value of the homeostatic concept in the curriculum, is that it permits the student to grasp a physiologic principle without having to learn each and every example of it at once. On the other hand one deficiency of this concept as presented in the medical curriculum, is that emphasis is placed almost exclusively on neural, physiological, hormonal or other chemical regulators. The way an organism behaves, however, serves as an additional and equally critical regulator of an individual organism's internal environment. This aspect of organismic regulation is generally minimized or overlooked entirely.

Richter's (82) experiments provide an excellent demonstration of how behavioral regulators interact with neural, hormonal and other regulating mechanisms, and thus contribute to the maintenance of a constant internal environment. These behavioral regulators become evident when elimination of the physiological regulators lead to specific changes in the animal's behavior. For example, if the adrenal glands are removed from rats, they lose their ability to regulate their sodium metabolism. Without adrenal aldosterone large amounts of sodium are excreted as salt in the urine. If provided only with their normal stock diet these rats die in from 8-15 days. (Fig. 4A) But if these animals are provided with two water bottles, one containing normal tap water and the other 3% NaCl, they will drink sufficient salt water to not only keep themselves alive, but free of symptoms of Na depletion. (Fig. 4B) When offered a variety of mineral solutions, such adrenalectomized rats increase their intake of all sodium salts, but show no appetite for chlorides. In other words, "drinking behavior" changes as the physiological regulators change.

Likewise, rats are able to maintain a constant body temperature, when provided with adequate nourishment, with the aid of a physiological heat regulating mechanism in the hypothalamus. But with a marked reduction in room

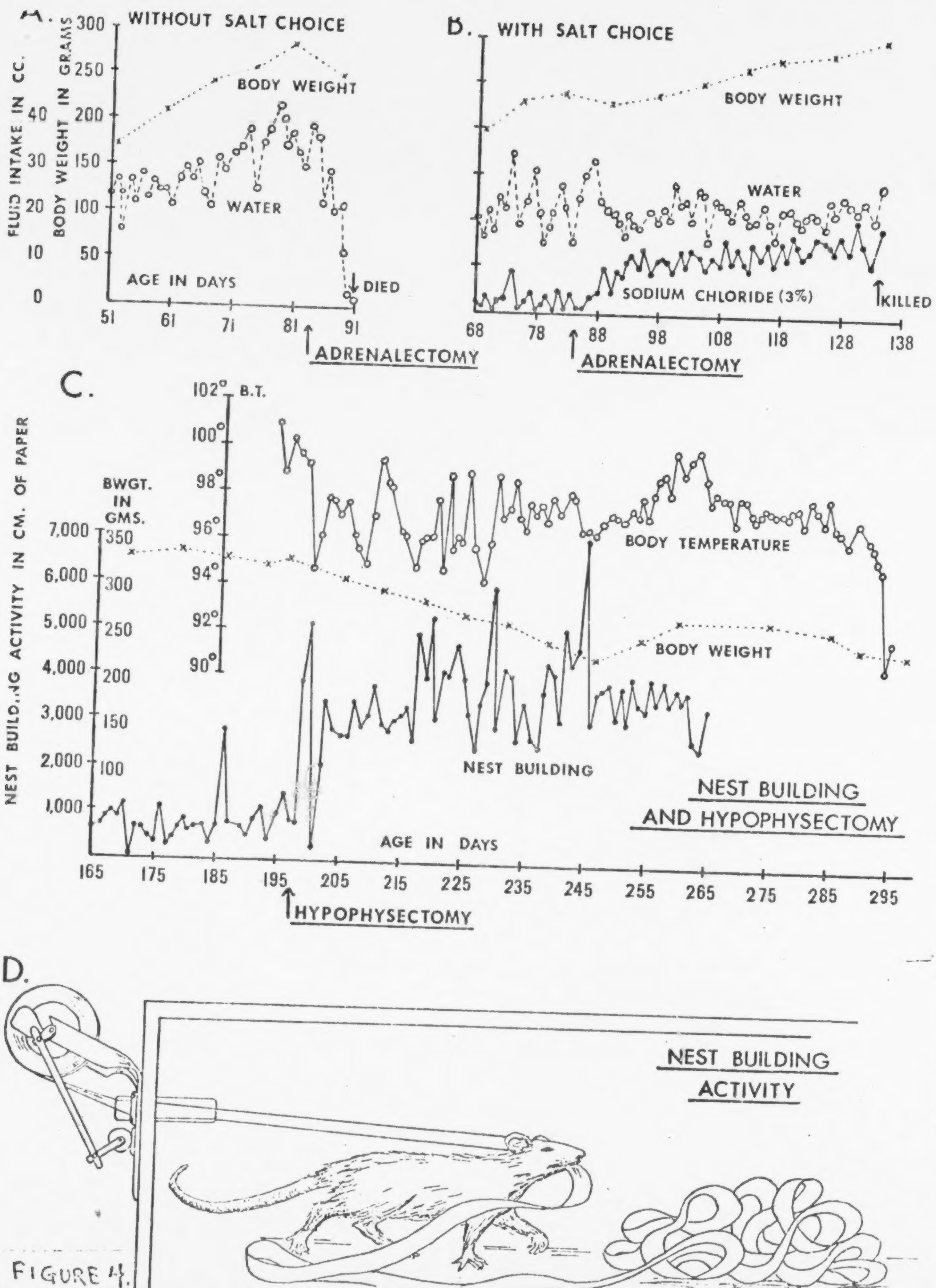
A.
WITHOUT SALT CHOICE
FLUID INTAKE IN CC.
BODY WEIGHT IN GRAMS
0
10
20
30
40
50
100
150
200
250
300
BODY WEIGHT
WATER
AGE IN DAYS
DIED
51
61
71
81
91
ADRENALECTOMY
B.
WITH SALT CHOICE
BODY WEIGHT
WATER
SODIUM CHLORIDE (3%)
KILLED
68
78
88
98
108
118
128
138
ADRENALECTOMY
C.
NEST BUILDING ACTIVITY IN CM. OF PAPER
BWGT. IN GMS.
B.T.
102°
100°
98°
96°
94°
92°
90°
7,000
6,000
5,000
4,000
3,000
2,000
1,000
350
300
250
200
150
100
BODY TEMPERATURE
BODY WEIGHT
NEST BUILDING
NEST BUILDING AND HYPOPHYSECTOMY
AGE IN DAYS
165
175
185
195
205
215
225
235
245
255
265
275
285
295
HYPOPHYSECTOMY
D.
NEST BUILDING ACTIVITY

FIGURE 4.

temperature, rats resort to increased nest building behavior in an endeavor to maintain their normal body temperature. By placing a roll of soft paper outside their cage, together with a cyclometer to measure the amount of paper used each day, it can be shown that when room temperature drops from 80 to 45 degrees F., the amount of paper used daily for nest building increases from 500 to 6,000 centimeters. (Fig. 4D) Likewise hypophysectomized rats, unable to produce adequate amounts of body heat, build much larger nests than normal rats, as can be seen from Figure 4C. The average length of paper utilized for nest building increased from 700 to 3,500 centimeters daily, and when provided with paper such rats maintain an almost normal body temperature and remain alive. If the hypophysectomized rats are denied paper with which to build nests, they die within a few weeks after a considerable drop in body temperature.

Additional experiments reveal the action of behavioral regulators in conjunction with a variety of physiological regulators. Parathyroidectomized rats, unable to regulate their calcium metabolism develop tetany and usually die within a few days on a regular diet, but will keep themselves alive indefinitely if given access to a solution of calcium lactate, as well as water. When pancreatectomized rats develop diabetes, and are offered carbohydrates, fat and proteins in separate containers instead of a mixed diet, they refuse carbohydrates and feed on fat and protein. As a result they lose the symptoms of diabetes - their blood sugar falls to its normal level, they gain weight and eat less food. To assist in eliminating unoxidized glucose, diabetic rats ingest large amounts of water, but when permitted to omit carbohydrate from their diets, pancreatectomized rats return to drinking normal amounts of water.

This is as good a point as any to emphasize that behavioral symptomology is an equally valuable diagnostic aid in a variety of disease syndromes.

Likewise the possibility should not be overlooked that phenomena often regarded under the category of perverted appetites such as coprophagy, placenta eating, bone eating, etc. may be instances of self regulation activity. Feces eating and urine drinking is frequently observed in animals, especially those on deficient diets. There are a number of experiments to indicate that infants and children, like animals, are capable of selecting a balanced diet, if given a free choice of a wide assortment of natural foods. Children with a vitamin D deficiency will voluntarily ingest varying amounts of cod liver oil if given free access to it.

Besides the polydipsia associated with diabetes, there is a marked craving for salt or food with a high salt content in patients with Addison's disease. Wilkins and Richter (83) have described a 3 1/2 year old boy, with destruction of adrenal cortical cells, who kept himself alive for more than 2 years by eating large amounts of salt or salted crackers. When admitted to a hospital for hormonal evaluation in connection with another condition, and confined to the regular hospital diet, he soon developed symptoms of insufficiency and died. Only after his autopsy was his salt-eating behavior pattern revealed.

Thus it would appear that apart from its value as a diagnostic aid in known disease syndromes, behavioral symptomatology often serves as a clue or indicator of lesser known physical disturbances. And apart from these instances in which physiological or chemical regulators are experimentally removed, it would appear that behavioral, physiological and chemical regulators are combined in the normal individual's quest for homeostasis. (See Figure 5 for a conceptual model of health based on the individual's capacity for homeostasis)

BIOLOGICAL CLOCKS AND RHYTHMICITIES

The term "biological clock" has been applied to the unknown, underlying mechanism or mechanisms responsible for the many biological processes, both at cellular and multicellular levels of organization in plants and animals, which demonstrate regularly recurring changes or rhythms. These rhythms may show a daily, monthly, annual or other recurring pattern of change. Since these rhythms were demonstrated to continue in organisms, even after they were deprived of obvious external cues, the organisms were considered to be capable of keeping time by means of some internal biological clock. (84), (85), (88).

A number of basic properties of biological clocks and rhythms have been delineated:

1) External cues such as light and darkness can set the phase of rhythmic process, i.e., can alter the time when the process is initiated, but cannot appreciably alter the interval of the clock. One can experimentally shift the phase so that it begins 3, 6 or 12 hours later, but once begun it then persists at the normal time interval - and subsequently continues to run at that interval, in phase, under constant conditions.
2) Under constant conditions of light, temperature, etc. a so-called daily rhythm may run slightly longer or shorter than 24 hours. (They run approximately 24 hours) hence the term circadian (about a day) rhythm.
3) Light cycles can be altered so that circadian rhythms run as long as 27 hours (long days) or as little as 18 hours (short days). When the circadian rhythms are stretched or shortened in this fashion, and the organisms are subject to constant conditions, the rhythms return to their approximate 24 hour interval. In nature, however,

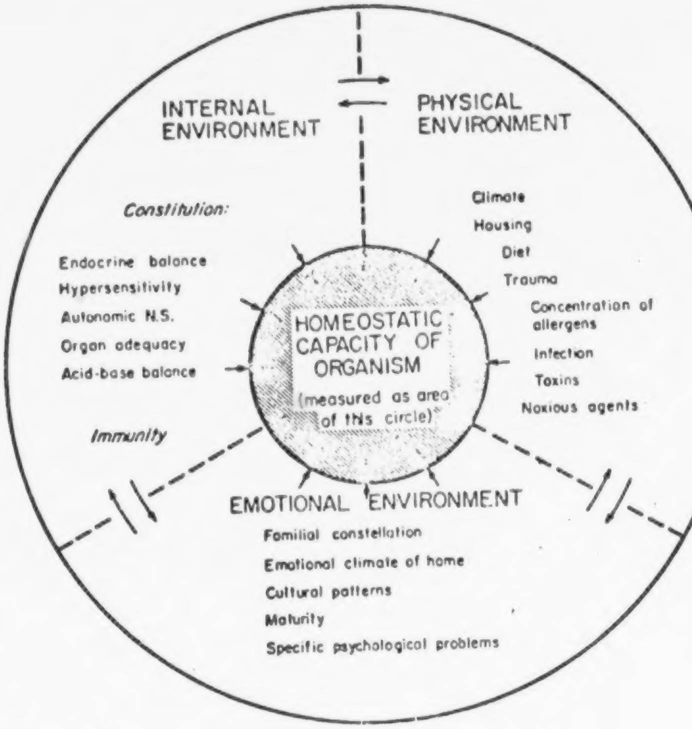
INTERNAL ENVIRONMENT
PHYSICAL ENVIRONMENT
Constitution:
Endocrine balance
Hypersensitivity
Autonomic N.S.
Organ adequacy
Acid-base balance
Immunity
Climate
Housing
Diet
Trauma
Concentration of allergens
Infection
Toxins
Noxious agents
HOMEOSTATIC CAPACITY OF ORGANISM
(measured as area of this circle)
EMOTIONAL ENVIRONMENT
Familial constellation
Emotional climate of home
Cultural patterns
Maturity
Specific psychological problems

Fig. 5 A conceptual model illustrating, in part, the interacting factors basic for an understanding of the patient. Helping the student to conceptualize this interaction is one of the challenges to clinical training.

Source: J. B. Richmond and S. L. Lustman, "Total Health: A Conceptual Visual Aid," *J. Med. Educ. 29*:23 (1954).

such rhythmic phenomena are locked or entrained into a 24 hour frequency by the daily light-dark cycles.

4) Circadian rhythm periods are very little affected by temperature change, suggesting that the clock itself is independent of biochemical process. A 10^{o} rise in temperature might be expected to double or triple the rate at which a biochemical system might run, but the temperature coefficients of circadian rhythm periods are normally in the range between 0.9 - 1.2.

5) Another argument against biochemical processes being responsible for the internal clock of the organism is that they are little effected by a variety of chemical inhibitors. A physiological process might be reduced greatly by the addition of cyanide (metabolism may sink as low as 5% of normal) but the period of the rhythm remains stable.

6) Raising organisms under constant laboratory conditions results in their becoming rhythmic without light cues, or remaining arhythmic until subjected to a single, non-periodic stimulus, whereupon they demonstrate the organ's normal rhythmicity. This indicates that the period itself is unlearned, i.e. genetically determined.

Investigators of biological clocks are by no means in agreement with regard to all the properties enumerated above. Frank A. Brown, Jr., (86) one of the pioneer investigators of biological clocks over several decades, has brought forth evidence to suggest that even under so-called constant laboratory conditions, organisms are utilizing subtle, rhythmic geophysical forces to establish the period of the clock itself. Colin S. Pittendrigh and others consider that rhythmic periods are entirely endogenous, while J. Woodland Hastings and his colleagues are attempting to establish a biochemical basis for the clock. Notwithstanding these endeavors at providing an underlying theory, the fundamental nature of the clock remains unknown.

On the human level both laymen and physicians are familiar with the daily fluctuations of temperature and fever in both normal individuals and sick patients, the rhythms of activity and sleep, the diurnal and nocturnal variations in output of urine, the regular occurrence of menstruation, etc. During the past twenty-five years sufficient research and information have accumulated to demonstrate the pervasive nature of these clocks throughout the biological world, (87), (89) as well as the highly adaptive nature of the rhythmic biochemical, physiological and behavioral processes with which they are associated. It would not be an exaggeration to say that rhythmic processes are a fundamental characteristic of living things. Both the researcher and the practicing physician needs to understand that biological processes do not always proceed at a constant rate when studied in the laboratory or hospital under so-called standard, unvarying conditions. Homeostasis itself is subject to a circadian rhythmicity, and many experimental findings may prove to be suspect if the investigator fails to take into account the normal cyclic fluctuations which many processes undergo during a given 24 hour period.

Medical students should be given an understanding of (1) the kinds of clocks and physiological fluctuations to be encountered in both somatic and mental illness, and (2) the ways in which modifications of cyclic behavior can alter deep-seated physiological and biochemical processes. All clinical and laboratory data, such as body temperature, pulse rate, urine output, blood counts, cell division, glucose tolerance, etc. are subject to circadian and other rhythmic fluctuation in a variety of somatic illnesses. Also, responses to drugs, toxins and pathogens vary according to the point of the cycle in which they are introduced.

In addition to circadian rhythms, some mental patients exhibit 48 hour clocks, and appear to lose their symptoms for a part of this cycle. Richter (90) cites the case of a schizophrenic patient who showed intense symptomology for a 24 hour period, then became almost normal for 24 hours, then had intense symptoms, etc. Another depressed patient alternated suicidal tendencies during one 24 hour period with nearly normal behavior during the next 24 hours. A catatonic-schizophrenic patient may also show regular attacks at 20 day intervals, but while thyroid treatment eliminates the cycles of symptoms, such treatment does not eliminate the patient's catatonic-schizophrenic condition. Thus while periodic mechanisms may not be responsible for the basic illness, phases of the clock cycles may play a role in the exaggeration, reduction or elimination of symptomology.

Other idiosyncrasies of clock-correlated symptomology are evidenced in cases of intermittent hyroarthrosis. In some patients swelling of the joints occurred at weekly intervals, but in one patient swelling of some joints reached a peak every Thursday, while other joints swelled every Friday. In still another case the right knee reached a peak of swelling on the average of every 10.0 days, while the left knee swelled every 10.6 days. (Figure 7)

Richter considers that homeostatic mechanisms, central nervous mechanisms or peripheral factors may underlie the periodic mechanism of symptom manifestation. Peripheral factors may be operating where different parts of the body are demonstrating different periods, or the same period manifests different phases in different parts of the body, as in the cases of intermittent hydroarthrosis above. Where the clock mechanism is altered by interfering with or eliminating the activity of one or more endocrine glands, however, a homeostatic clock may be operating. On the other hand, some clocks appear to remain constant regardless of internal changes within the organism, or environmental changes outside it. The 48 hour clocks of certain mental patients mentioned above may fall into this category, and it is believed that the hypothalamus, as well as other regions of the central nervous system, may harbor clocks of this caliber.

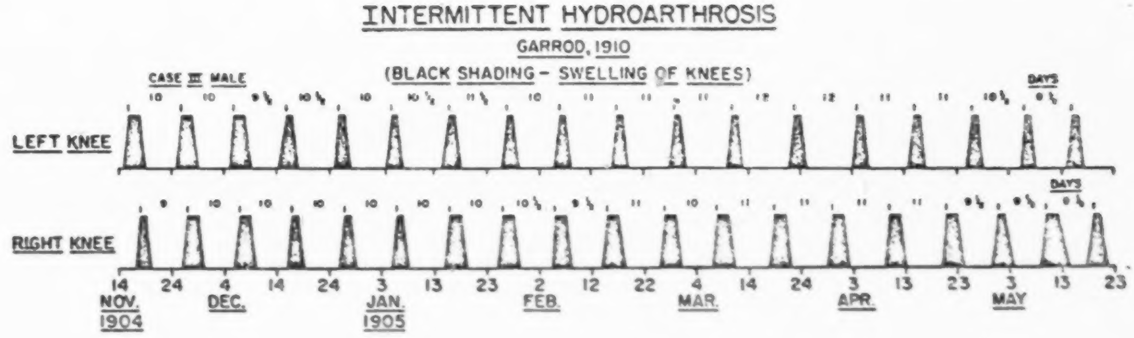

Figure 6. Graphic representation of the occurrence and duration of swelling of the right and left knees in a patient with intermittent hydroarthrosis. (After Garrod, 1910)

There is also increasing evidence that interference with many normal physiological processes may result from interference with the behavioral manifestations of clocks. The sleep-dream cycle is one of the body's basic behavior cycles. Not only elimination of sleep, but the alteration of its onset may interfere with a variety of endocrine and metabolic processes. This has become increasingly apparent with the rapid movement of air passengers from one time zone to another. A move involving as little as 2-3 hours of change of time zones, may require several days or a week before all the internal physiologic and endocrine processes are recoordinated with the new sleep-activity cycle.

Not only is the sleep cycle correlated with various metabolic functions, but it appears that the dream state (D-State) is a normally cyclic phenomenon within sleep, characterized by a peculiar activity pattern involving rapid eye movement (REM) and a ninety minute cycle of its own. (91) It has been shown that when sleep subjects are given adequate hours of sleep, but dreaming is interfered with - these subjects become D-State deprived. There is some indication of mental instability following experimentally induced dream deprivation for 10-15 days. Dream deprived sleep subjects "make-up" previous nights of dream deprivation by dreaming for longer periods after several nights of deprivation. This appears to be especially true of the earlier stages of the human life cycle. Thus a week old infant will spend over 37 per cent of the day in D-state and 25 per cent in the D-state at 6 months of age, while a 20 year old adult will spend 12 per cent of the day in the D-state, and less than 10 per cent dreaming may be shown at 60 years of age. Dreaming itself may be a biological need, rather than a chance idiosyncrasy. Hartmann considers that the D-state plays an important role in the neurochemical homeostasis of the central nervous system.

There appears to be a very definite sequence of cycles of sleep, rest, and activity in the newborn infant correlated with alternating periods of parasympathetic and sympathetic activity in the autonomic nervous system. There is a marked change in these sleep and activity cycles over the first 2-3 years of life, and a less marked but no less definite change over the first 18 years of life. As noted, the D-state occupies a considerable portion of the sleep state of the first two weeks of infant life - as much as 45-65 percent of it. The extremely large values of D-time in the neonate and young child suggests that it may have an important developmental function, in which case interference with early sleep activity cycles in the infant and child may possibly be correlated with later developmental disturbances. This remains to be more fully investigated.

Also under investigation is the extent to which periodic bouts of alcoholism, allergies, histamine skin reactions, periods of forgetfullness, stress reactions, etc. may be correlated with biological clock mechanisms.

THE BIOBEHAVIORAL BASIS OF HUMAN CHARACTER AND SOCIAL BEHAVIOR

Notwithstanding the role that fixed motor patterns play in animal social behavior, the behavioral scientist is unlikely to recognize any connection between the functions of the human neuromuscular system and the behavioral science disciplines. The biobehavioral relationships covered thus far are more apt to be considered a part of human physiology and clinical medicine, rather than of relevance to anthropology, psychology or sociology. This section is designed to correct this misconception.

Apart from indicating connections between the neuromuscular system, other physiological processes and clinical syndromes, the previous realms of material should establish facts and principles capable of altering the way we look at man and human development. To begin with, all organisms with a complex nervous system contain a repertoire of genetically determined neuromuscular coordinations, or fixed motor patterns, which are subject to evolution. On principle alone, therefore, one would not expect that the central nervous system of man, evolved from the nervous systems of ancestral vertebrates, mammals and primates should be devoid of such motor patterns. Indeed, embryological, observational, and early development data amply support the fact that the human central nervous system contains a wide range of behavior patterns which enable the infant to form a relationship with its mother, to engage in emotional interactions and other non-verbal communication, to carry out sequences of locomotion and posture, and to begin manipulating both the physical and social environment. (92)

It is during the intensely biological relationship between the mother and infant that these phylogenetically determined motor patterns are shaped, "programmed" or secondarily integrated in each individual. That is to say, the mother plays a crucial role in facilitating, repressing, or even over-exciting these various patterns of response. (93) She is the most direct programmer of these behaviors. As the child grows, however, the father and various siblings, or other members of the extended family also play a role in shaping these early, primitive animal response patterns. The father (also various grandparents) by his dynamic interaction with the mother also influences what behaviors of the infant will be supported or suppressed. From the point of view of what is contained in the central nervous system, the infant is phylogenetically programmed at birth. As a result of utilizing these specific behavioral interactions with the mother, then other family members, the infant's basic neuromuscular responses are secondarily or ontogenetically integrated.

During the early years of childhood and subsequently, these early response patterns become the characteristic way in which the child, then the adult relates to other people. The child's capacity for intimacy and relatedness, how passive or active the child is in seeking social needs and maintaining social relationships, the manner in which it handles frustration, anxiety and disappointments, its ability to express emotional responses, its capacity for pleasure and the sharing of pleasure - these are all part of these early response patterns, and form the basis of later social and family behavior. The fate or programming of these human fixed motor patterns is central to psychiatry, psychosomatic medicine and the behavioral sciences.

Several features of these early mother-infant interactions should be emphasized. First, these early behavior patterns are taking place simultaneously with the rapid growth occurring during infancy and childhood. There is abundant documentation that physiologic modification during active growth modifies the nature of that growth. Behavioral modification, which always involves autonomic, endocrine and other physiologic changes is equally capable of modifying growth processes, with the result that these early behaviors become anchored in the total somatic changes which are occurring at this time. The early behaviors are therefore "grown" into the organism, and not merely learned. There is no separate development of somatic and psychic structure, which pediatricians and child psychiatrists would lead us to believe, but a unified integration of behavior with growth processes throughout the life cycle.

The several aspects of this early growth of behavior into the organism would include a) neural growth - the growth of dendrites, and the synaptic knobs and spines (as revealed by recent electron microscopy studies) by which inhibiting or excitatory synaptic connections are made in the cortex; b) the influence which the neuromuscular tonus changes (associated with the infant's changing attitudes, posture, etc.) exert on the entire skeleton and its growth; and c) the previously mentioned influence that these early behaviors exert on endocrine, respiratory, biochemical, autonomic and other physiologic processes. The net result is that not only the psyche, but the somatic structure of the individual is altered by these early behaviors. These characteristic modes of responding, together with their structural changes, results in the formation of human character structure. (Figure 7), (96).

Character structure is the resultant of all the significant behaviors that have been integrated in a characteristic way during early development. Biologically speaking, it constitutes a phenotypic modification of the neuromuscular responses of man. Although the oral, anal, and genital functions, as well as early emotional responses, play a preponderant role in this integration, they are not the only motor functions which contribute to its development. For example, the early respiratory pattern of the newborn infant is extremely vulnerable to perinatal insult, postnatal trauma and subsequent environmental modifications. The psychoanalyst Erikson (94) recognized this in referring to an initial oral-respiratory-sensory stage of human development. Furthermore, just as Freud linked the psychological traits of orderliness, frugality and obstinacy to anal character structures, so Erikson links such traits as basic trust, shame, doubt, initiative, guilt, a sense of incompetence, confusion, etc., with the outcome of specific behavioral (motor) stages of early development. It is in this psychobiological area of neuromuscular development that the hard-core clinical areas of medicine, psychiatry and the behavioral sciences meet. In a sense Karen Horney (95) recognized this behavior-growth relationship when she spoke of neuroses as being altered forms of growing.

Support for this neuromuscular aspect of development may be seen in the abreactive phenomena which emerge during psychotherapy, when the long forgotten emotions of childhood - aggression, envy, hate, jealousy and love emerge as intense displays on the motor level. Very early aspects of these abreactive phenomena emerge even more intensely when lysergic acid diethy-

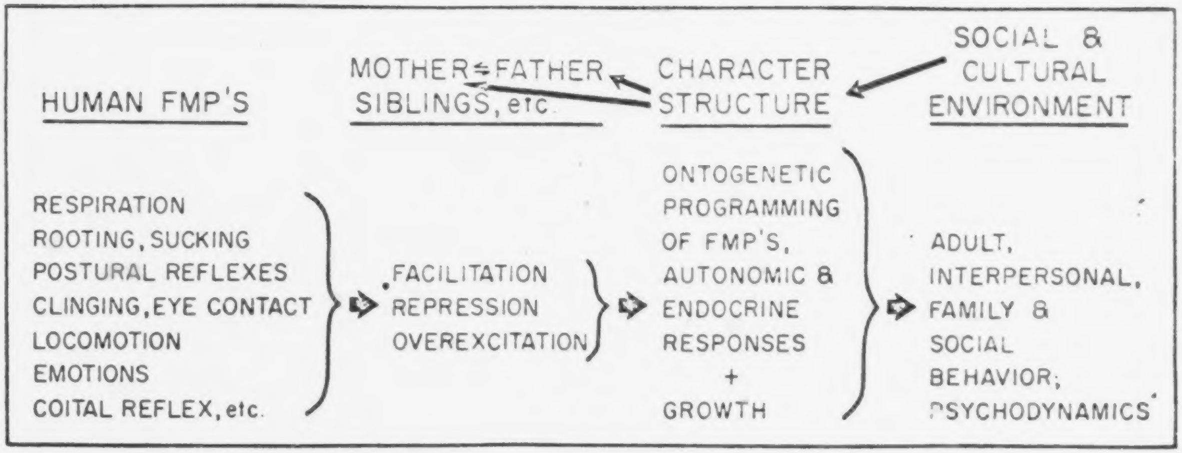
HUMAN FMP'S
MOTHER⇆FATHER
SIBLINGS, etc.
CHARACTER STRUCTURE
SOCIAL & CULTURAL ENVIRONMENT
RESPIRATION
ROOTING, SUCKING
POSTURAL REFLEXES
CLINGING, EYE CONTACT
LOCOMOTION
EMOTIONS
COITAL REFLEX, etc.
FACILITATION
REPRESSION
OVEREXCITATION
ONTOGENETIC PROGRAMMING OF FMP'S, AUTONOMIC & ENDOCRINE RESPONSES
+
GROWTH
ADULT, INTERPERSONAL, FAMILY & SOCIAL BEHAVIOR; PSYCHODYNAMICS

Figure 7. Some interrelationships of human fixed motor patterns, the mother, family, the social and cultural environment, and the formation of character structure. (After Kramer, 1972)

lamide is used as an adjunct to psychotherapy. For example, infantile sucking behavior emerges in almost all such patients with such intensity that therapists have felt compelled to respond to this primitive need by providing patients with a pillow, a finger, on which to suck. When this is done, patients frequently recall the nature of their early sucking experiences, - whether pleasurable, frustrating, or unavailable at times of their greatest need. Aggressive biting and kicking, or clinging behavior also emerge, as well as ambivalent patterns of behavior such as aggressive biting during attempts at a loving embrace. It would appear that none of these early behaviors are actually ever lost from the adult nervous system, if we are to believe the therapeutic responses of patients ranging from 18-54 years of age.

Once formed, adult character structure then provides a) the basis for the individual pattern of emotional responses which acts as a mediator of interpersonal and family behavior; b) the mechanism through which the social environment influences social behavior; and c) the psychosomatic background for response to stress, the invasion of pathogenic organisms or other noxious agents, to drugs, for convalescence, wound healing, etc.

The way in which a given mother programs her infant's fixed motor patterns is only indirectly influenced by the culture or subculture to which she belongs. The ontogenetic programming of the infant and child is more directly and specifically the result of her own capacity for relatedness, and her own character structure. It is largely through the character structure of the parents that the social environment or culture exerts its influence on the developing infant and child, as far as the patterning of its basic responses are concerned. The character structure of the father, the relationship of the father and other members of the extended family to the mother, and other factors are all capable of influencing what behaviors the mother will respond to, facilitate or suppress in the infant. Likewise, the socio-economic, political and technological environment, largely as it influences family structure and dynamics, is also capable of influencing man's biopsychosocial behavior and the formation of character structure. (96)

We have now slipped into the field of human psychodynamics. (97) At this biological level, the behavioral relationships which surround the infant and child differ little from the ecodynamic determinants of behavior which ethologists deal with when analysing the evolution of social behavior and organization in animals. The patterning of early behaviors in the infant and child, character formation, interpersonal behavior, family psychodynamics and social behavior form a continuum which underlies all social organization and every culture. (See Figure 8 for a related conceptual model utilized by the sociologists Gerth and Mills).

It is these essentially phylogenetic and ontogenetic considerations of the human neuromuscular system which provide the basic hard data for the clinical problems with which psychiatrists and psychoanalysts deal. Without a background in evolutionary biology, it is doubtful that psychiatry and the hard-core clinical areas of medicine will ever be able to communicate with each other. Although a few anthropologists (98), (99), (100) and sociologists (101) have drawn attention to this neglected area, the mainstream of behavioral scientists still disregard, both in theory and research, the evolutionary aspects of the human neuromuscular system, its role in the formation of character structure and in mediating social behavior.

Some indication of the structural aspect of character formation may be gleaned from Figure 9. The neuromuscular programming that takes place in the first years of life results on the one hand in an individual pattern of emotional responses and social behavior, and on the other in an individ-

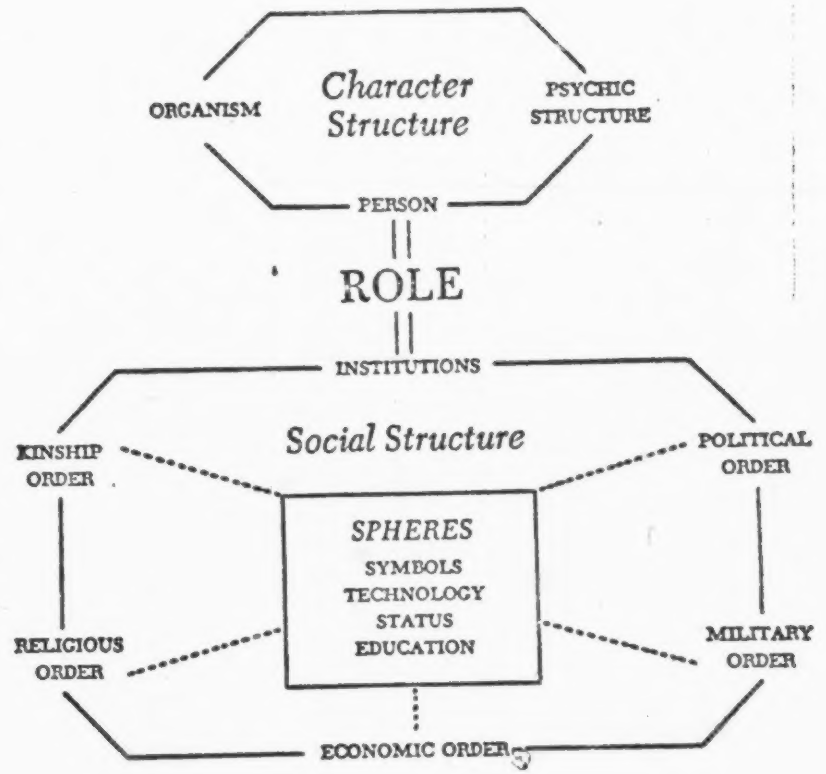
Character Structure
ORGANISM
PSYCHIC STRUCTURE
PERSON
ROLE
INSTITUTIONS
Social Structure
KINSHIP ORDER
POLITICAL ORDER
SPHERES
SYMBOLS
TECHNOLOGY
STATUS
EDUCATION
RELIGIOUS ORDER
MILITARY ORDER
ECONOMIC ORDER

Figure 8. Character structure, role theory and social structure as seen by the sociologists Hans Gerth and C.Wright Mills.

ual's posture and characteristic way of walking, moving or otherwise expressing oneself. This is undoubtedly the basis of agreement among kinesiologists, orthopedic surgeons, psychoanalysts, etc. that psychological elements play a role in every individual's posture and movement. Although we continue to assign disturbances of emotional and social behavior to psychotherapy, and disturbances of movement or posture to physical therapists, these two therapies have more in common than generally acknowledged.

The psychotherapist endeavors to change an individual's attitudes and emotional (neuromuscular and autonomic) responses, and the ultimate success of therapy is based not on how much the patient has learned (an intellectual response to therapy is destined for failure), but on the actual alteration of his behavior patterns. Gellhorn has pointed out that underlying all psychic disturbances there exists an alteration of autonomic functions, and suggests that the basic problems of psychotherapy are in this realm. Character analysis and vegetotherapy, a somatic approach which evolved from psychoanalysis, utilizes the relationship existing between neuromuscular patterns, respiration and other autonomic functions in its system of psychotherapy. (102) And it is of interest that most psychotherapists will tell a patient who has apparently completed his course of therapy, that he will require a year or two to "restructure" his new insights and behaviors in actual living experience. The physical therapist or training coach starts with a program of movement, and ultimately changes the autonomic functions and structure of the trainee.

The significance of the concept of character structure might be delineated from the following, or similar examples. Some years ago Funkenstein (103) and his coworkers found that two groups of psychotic patients responded with a different pattern of blood pressure modification to injection of the drug mecholyl. These two groups differed in their projective psychological

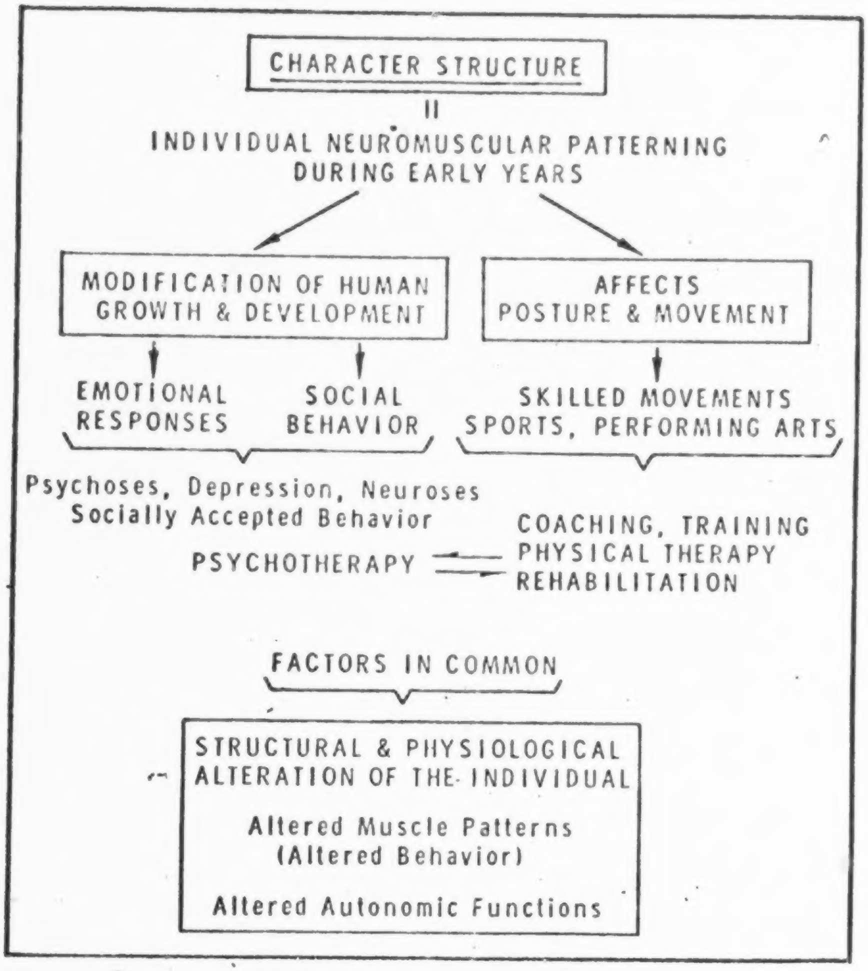
CHARACTER STRUCTURE
=
INDIVIDUAL NEUROMUSCULAR PATTERNING DURING EARLY YEARS
MODIFICATION OF HUMAN GROWTH & DEVELOPMENT
AFFECTS POSTURE & MOVEMENT
EMOTIONAL RESPONSES
SOCIAL BEHAVIOR
SKILLED MOVEMENTS SPORTS, PERFORMING ARTS
Psychoses, Depression, Neuroses
Socially Accepted Behavior
PSYCHOTHERAPY
COACHING, TRAINING
PHYSICAL THERAPY
REHABILITATION
FACTORS IN COMMON
STRUCTURAL & PHYSIOLOGICAL ALTERATION OF THE INDIVIDUAL
Altered Muscle Patterns
(Altered Behavior)
Altered Autonomic Functions

Figure 9. Relation of character structure to psychotherapy and physical therapy (After Kramer, 1969).

tests, their response to electric shock treatment, etc. Independent psychiatric evaluation indicated that these two groups differed emotionally - one group was generally angry at other people, the other group was usually depressed or frightened.

Are there similar patterns of emotional difference in normal, healthy people? While a group of medical students were in a situation of personal emotional stress (awaiting the decision of hospitals to their applications for internships) they were injected with mecholyl. Their blood pressure responses likewise fell into two groups, indicating that some students were angry at other people during this period, others were angry at themselves. After the decisions on internships were made, all students showed similar blood pressure responses to mecholyl. Additional experiments indicated that students who directed their anger outward had a higher secretion of noradrenalin, while those who reacted with depression and anxiety had a higher adrenalin secretion.

Although Funkenstein did not describe them in so many words, it seems clear that he was dealing with roughly two different groups of students and that the different blood pressure responses to the same drug, mecholyl, were due to the students' different character structures, which include not only their emotional and behavioral differences, but their neuroendocrine and physiologic responses.

At earlier stages of childhood there is a greater tendency to direct anger outward, but with age anger tends to be suppressed or directed towards self. Hokfelt and West have shown that the ratio of noradrenalin to adrenalin is higher in infants than in older children, who have been subjected to "socialization." The character structures of the medical students, then, included those that had maintained their outward-directed responses of anger, and those that hadn't. It should be noted that the two different character structures failed to show a differential response to mecholyl under normal circumstances: it was only when these character structures were under a stressful situation* that two different cardiovascular responses to the same drug were revealed.

The phenomenon of growth — biological growth — is the single most neglected phenomenon in all considerations of man's psychological development. Behavior and growth are traditionally considered as separate realms, with the result that we have almost completely lost sight of the mutual interaction of behavior and growth processes throughout the human life cycle.

From the moment of conception, any interference with the growth process is capable of modifying individual development. Figure 10 represents a schema to suggest some of the growth-environmental-interactions of the human organism. Except for the presence of certain embryological "critical periods," it may be said that the earlier the interference, the more marked the change in growth. The distinction between prenatal and post-natal growth modifications, of whatever origin (hormonal disturbances, the presence of micro-organisms, the mother's use of drugs, or stressful emotional reactions, etc.) are more apt to be revealed as structural anomalies of the growth process, and are considered to fall within the province of the biologist, embryologist, or teratologist.

A significant portion of the child's growth processes, however are also affected postnatally through modification of its behavior in the social

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*Likewise Brady has shown that electric shock alone will not produce ulcerative colitis in rhesus monkeys. When one ("executive") monkey is in the stressful situation of making decisions to avoid shock, however, and the decision-making periods bear a specific time relationship to the normal biological rhythmicity of HCl secretion, ulcers are produced in the executive monkey with predictable regularity. (104)

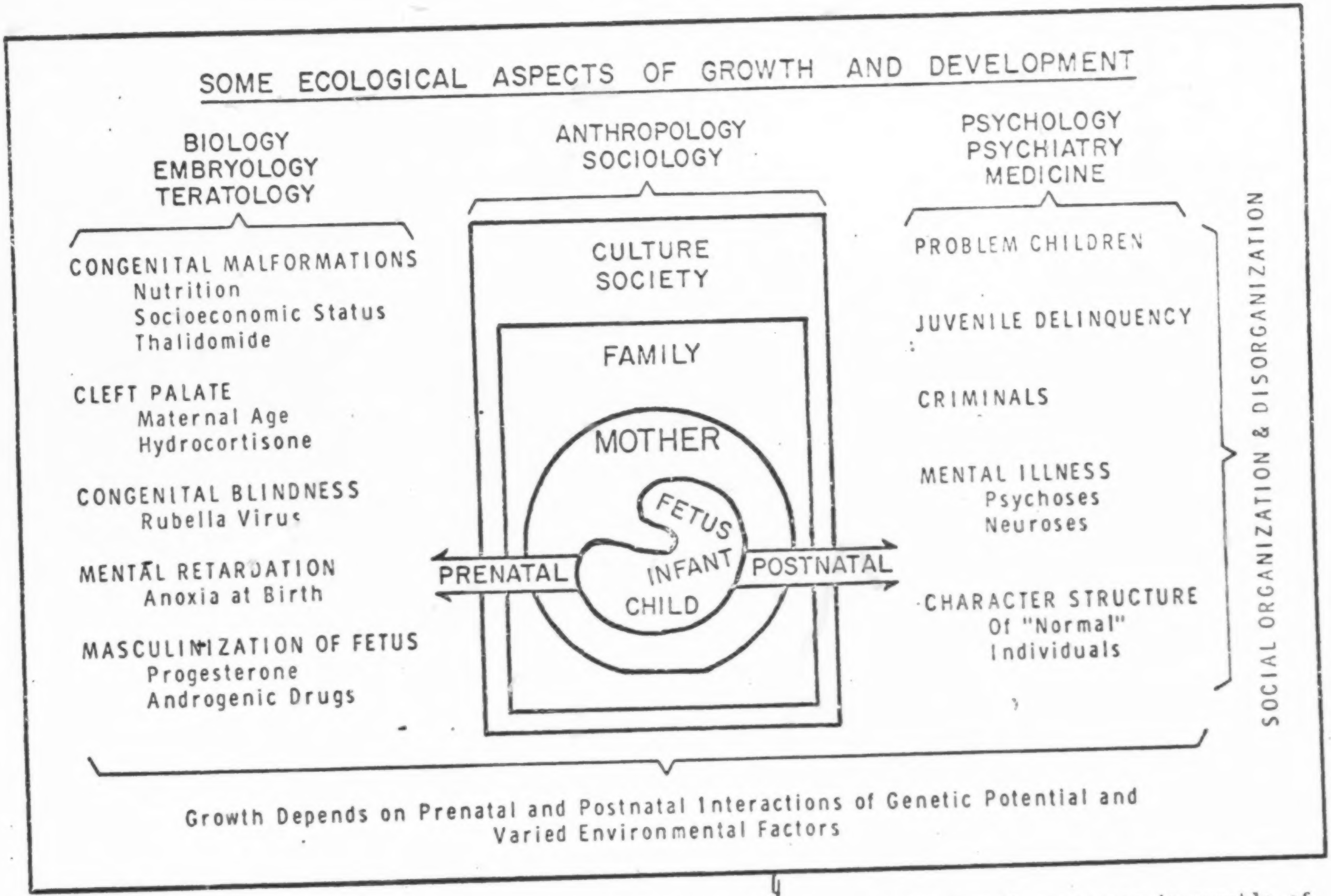
SOME ECOLOGICAL ASPECTS OF GROWTH AND DEVELOPMENT
BIOLOGY
EMBRYOLOGY
TERATOLOGY
ANTHROPOLOGY
SOCIOLOGY
PSYCHOLOGY
PSYCHIATRY
MEDICINE
CONGENITAL MALFORMATIONS
Nutrition
Socioeconomic Status
Thalidomide
CLEFT PALATE
Maternal Age
Hydrocortisone
CONGENITAL BLINDNESS
Rubella Virus
MENTAL RETARDATION
Anoxia at Birth
MASCULINIZATION OF FETUS
Progesterone
Androgenic Drugs
CULTURE
SOCIETY
FAMILY
MOTHER
FETUS
INFANT
CHILD
PRENATAL
POSTNATAL
PROBLEM CHILDREN
JUVENILE DELINQUENCY
CRIMINALS
MENTAL ILLNESS
Psychoses
Neuroses
CHARACTER STRUCTURE
Of "Normal"
Individuals
SOCIAL ORGANIZATION & DISORGANIZATION
Growth Depends on Prenatal and Postnatal Interactions of Genetic Potential and Varied Environmental Factors

Figure 10. Ecology, growth, development and society. All interference with growth processes is capable of modifying individual development. While the distinction between prenatal and postnatal modification is largely an arbitrary one, the earlier the interference the more marked the change, except for the presence of certain "critical periods." The earlier the interference, the more evident are the strutural changes; the postnatal interferences are more apt to be characterized as "behavioral disorders." The disciplinary distinctions for studying this continuum is likewise an arbitrary one, but the individual modifications [illegible] co[illegible] but [illegible]o, [illegible] influence [illegible] social structure." (After Kramer 196[illegible])

environment. This is traditionally the realm of the anthropologist, sociologist and social psychologist. These behavioral modifications are considered "psychological" but are no less physiological and structural. They provide the basis for human character formation, which in turn underlies social behavior, and ultimately plays a role in the fluctuating changes in social structure. It is possible, therefore to view all these phenomena as part of the growth-environmental-interaction continuum, rather than as distinct entities which fall within narrow disciplinary considerations.

DISCUSSION

The medical areas with which anthropologists (105) and sociologists (106), (107) have concerned themselves include:

1. How people perceive, define and respond to symptoms or illness.
2. The relation of age, sex, race, socioeconomic status, and other facts to mortality.
3. The social etiology and epidemiology of disease conditions; the sources of stress in social life and the relation between social stress and illness.
4. The sociology of medical education and the social values of medical students.
5. Practitioner-patient relationships, and the organization of medical service and practice under various medical systems.
6. The increasing technology and bureaucracy, intraprofessional rivalry, power relationships, decision-making, and other factors that influence hospital organization and medical service.
7. The relationship between the various health agencies in the community.
8. The relationship of social influence, community growth, change and conservatism to public health and preventive medicine.

9. The relationship of medical policies, politics and economics to the development of health systems and policies.

Medical faculties, administrators and medical organizations have viewed the results from the first four or five of the above areas with considerable interest. It is not surprising, however, that the insights derived from the last-mentioned realms often meet with resistance, even though capable of contributing to the more effective operation of the medical institutions involved. For example, power relationships often so outweight objective consideration of curriculum content that curriculum change is regarded as a tool for maintaining or shifting the power quotients of various departments or individuals.

Valuable as all these areas may be to medical problems and services, it can be seen that only items 2 and 3 are relatable to the functional, physiological processes which medical students focus upon, and which underlie illness. In general, behavioral scientists do not make these connections - and most often basic scientists and clinicians assume that since such material is being covered by behavioral scientists, they can emphasize the biochemical, cellular pathology and symptomology aspects alone. In this way the middle area of bridging mechanisms is neglected or treated superficially.

Since behavioral scientists have been able to provide insights about medical problems, often with minimal training in the biological or physiological sciences - even as Skinner with his "black box" methodology was able to develop learning theory with no consideration of what takes place in the nervous system of his animals - it might be argued that they need not support their insights with an understanding of the biobehavioral mechanisms underlying the processes they examine. This is partly true. After all, the unique characteristic and contribution of the behavioral sciences to medicine is the capacity for turning up correlations or indica-

tions of the influence of the social environment on health and illness when the biological and physiological mechanisms are still unknown. A little reflection, however, will indicate why this is not a valid argument within the medical school environment.

Part of the difficulty lies in the fact that the sociologist often views human behavior within the framework of human adaptation, learning theory or role theory. He rarely views behavior from a biological, evolutionary or developmental perspective. There are exceptions* but in general the diverse emphasis of sociologists are social-psychological in orientation and very often are opposed to any consideration of psychoanalytic-developmental concepts, with the result that biological concepts of development are given minor consideration or are entirely ignored. It is doubtful, for example, that the role theory concept of personality of the sociologist will ever be acceptable to the psychiatrist. The latter's daily clinical calendar throws him into contact with the ever-present emotional responses of the interpersonal interactions of his patients - he cannot deal in "roles." Nor should he. Emotional reactions enter into every interpersonal or group interaction, and the physician focusing on the many psychosomatic aspects of illness cannot afford to ignore either personality or characterological considerations, as well as the emotional responses, of his patients. At this level, at least one group of physicians and behavioral scientists *will talk past or around each other*, rather than to each other. Likewise,

*Hans Gerth and C. Wright Mills have endeavored to integrate the biological aspects of man, his psychic structure and his social roles under the concept of character structure, and suggest that social psychologists and sociologists pay more attention to this bio-social entity, in studying social structure than they have in the past. Nevertheless most sociologists still view the person primarily as a player of socially determined roles. (See Figure 8). Fletcher has also put together a comprehensive model of the ethological-psychological basis of human nature, and indicated its implications for sociological theory.

most psychologists utilize the learning theory model, rather than a maturational-developmental model which the psychiatrist and psychoanalyst rely upon. (108)

It would therefore be a mistake, even arrogant, to assume that the sociologist or physician-behavioral scientist team can "teach" the patient what other educational and social institutions have failed to do. This assumption is inherent in the endeavor of so many behavioral scientists to substitute an educational model for a medical model, especially when dealing with the mentally ill. Indeed, this sometimes leads medical students to view the activities of behavioral scientists as a threat both to their professional roles and to the organization of medical institutions. Social scientists have done much to remove the myth of the omnipotent physician, but omnipotent behavioral scientists will not replace them. What is required is an expanded clinical model which will take into account the important social processes which behavioral scientists can clarify for us. To do this effectively, medical students require a biological link which relates physiological and biochemical events in the organism to the social environment. That link can best be provided by the biobehavioral events which enter into the responses which are part of every interpersonal and social interaction. (109)

Purportedly, the behavioral sciences are being introduced into the medical curriculum to enable medical students and future physicians to deal with the psychological and sociological aspects of human health and illness. Many of today's medical students are expressing a desire to deal more adequately with the social environment as it relates to health, but for all practical purposes the average medical student will have little or no appreciation of the biological mechanisms acted on by the biochemical and cellular systems he normally focuses upon from the viewpoint of functional biology. Chalke (110) also emphasizes that a greater contribution from biology is required in the science of "behavior."

The neuromuscular system is the behavioral system of man. It is only through movement that the human "mind" can communicate with other minds. Except in instances of nutritional deficiency, or in terms of environmental pollution, the social environment does not exert a direct action on the biochemical and physiologic processes within the individual. Whatever the social environment's influence on man's physiologic systems, it accomplishes indirectly by acting on man's behavioral system. It is largely this fact which provides the evolutionary and continuing basis for man's capacity to be the social animal that he is. When interpersonal or family relationships are disrupted, it is largely to processes at this primitive, biological level of behavior that the psychiatrist turns for an understanding of what has gone wrong -- processes begun with the extended mother-infant relationship and initiated long before the child acquires a verbal language.

These processes play a central role in human development, and result, through the social repression of behavior in the development of human character structure - a phenotypic modification of the neuromuscular system of man. Without this behavioral modification of each individual, human social systems, as we know them today, would not be possible.

It is this behavioral system which has shown itself to be capable of influencing all the physiological, functional processes of the hard-core clinical areas of medicine. It is this behavioral system which lies at the heart of those psychodynamic constructs with which the so-called soft-core areas of psychiatry and psychoanalysis deal. And this behavioral system, through the operation of human character structure, provides the underpining for human social systems and the institutions about which anthropologists and sociologists have something to tell us. If the information explosion in the biological medical and behavioral sciences supports this viewpoint, and I believe it does, then the medical curriculum can no longer afford the fragmented approach to the study of behavior which has traditionally prevailed.

I know a number of very capable medically oriented behavioral scientists who will reply to the above by saying: "It's not necessary that these biobehavioral mechanisms be taken into account for us to teach behavioral science or sociological concepts effectively to medical students. Give me a block of time - say 80, or 120 hours in one year, 20 or 30 hours in another year, and we will effectively channel the future physician's orientation along biosocial lines." Even if this statement were true (and we will not know the answer to this until physicians have effectively changed the pattern of medical care, the distribution of medical services, etc.) can we afford to simply add blocks of time to the existing curriculum? Just as there has been an explosion of knowledge in the behavioral sciences, so there has been an information explosion in biology and in medicine itself. Programs in rehabilitative medicine, community medicine, cardiovascular and stroke therapy, surgery, etc. have also witnessed tremendous developments in knowledge and techniques, and are also requiring more time in the curriculum. We cannot solve this problem by simply adding blocks of time to what many students and faculty already consider to be an overburdened curriculum.

"The tendency to expand the medical school curriculum by accretion does not seem rational," writes Richmond, (111) Dean of the College of Medicine at the State University of New York at Syracuse. The material in the biobehavioral curriculum outlined herein could be presented in 18-20 hours. One would prefer that it be woven into an interdisciplinary course (including basic, behavioral and clinical sciences) designed to provide a conceptual model of the nature of the human organism. A comprehension of the roots of human behavior should provide the medical student with self-knowledge of his own biological, psychological, and social nature. (111a)

A considerable amount of curriculum change has already taken place in medical schools throughout the United States during the past decade. It is generally recognized that many curriculum changes are ultimately determined by departmental territoriality and power quotients. (112) Even where interdisciplinary courses are organized by groups, it frequently happens that the habits associated with departmental and disciplinary autonomy carry over to the interdisciplinary groups. Little wonder, then, that behavioral scientists are requesting, and receiving, departmental status and a valid share in the decision-making that enters into curriculum change. There is some tendency to avoid these power disputes by appointing such interdisciplinary groups directly under the dean of the college, but it is still difficult for such groups to function without the cooperation of the departments.

One can hardly avoid the conclusion then that departmental status is required to provide behavioral scientists with a setting conducive to their growth and integration within the medical school. (113) Tyler (114) has noted that while most efforts to rebuild the curriculum show great promise for a while, they are generally abandoned after five or ten years. "This is largely due," he notes, "to the institutions failure to make those changes in its structure and functioning that will support and promote, rather than oppose, a dynamic process of curriculum development." Without such changes, the energy involved in new curriculum undertakings diminishes and the effort itself ceases.

Granted that behavioral science teaching is desirable, and that behavioral science departments are required, such departments as have been formed in medical schools deserve closer examination. One glaring deficiency of such departments is that behavioral science is being interpreted along the traditional lines of the disciplines of psychology, sociology and anthropology. The biological approach to behavior as represented by ethology, is generally absent, as is the anthropological, ethological, psychological and experimental approach to exciting developments in the field of primate social behavior.

Another tendency is for such departments to be either largely anthropologic-sociologic, or psychologic in personnel and orientation. Unfortunately behavioral scientists, like neurophysiologists or clinicians, feel more comfortable with personnel of their own kind. Perhaps future departments will include one or more biologically oriented or trained behavioral scientists. One function of existing behavioral science departments will undoubtedly be to train anthropologists and sociologists with a stronger background in human biology. In recognition of this need, a cooperative development currently initiated between the liberal arts college and medical faculty at Stanford University involves the formation of an undergraduate department of human biology. Those majoring in human biology will go on to take graduate study in anthropology, psychology, sociology, medicine, law, etc. It is anticipated that graduates in diverse, but now increasingly related disciplines, will share a common base of understanding about human development and behavior.

When Grantly Dick Reed finally won approval for his method of natural childbirth, he discovered that his problems were by no means over. Obstetric and pediatric nurses were so set in their ways that they interfered at all stages with the processes and aftermath of the natural childbirth method. He concluded that if his methods were to be made widely effective he would have to train his own "natural childbirth nurses." Similarly, new curricula for the training of medical anthropologists, sociologists and clinical psychologists will have to be encouraged and explored.

Yet another outcome of such behavioral science departments, or efforts as exist, is that when a given behavioral science or interdisciplinary course is examined - the psychiatrists are presenting a maturational-developmental model of psychodynamics, the psychologists are presenting a learning theory-behavioral reinforcement model, and the sociologists a role-theory model. Such a course might better be described as "multi-disciplinary" rather than interdisciplinary. But whatever the appellation, students are often presented with conflicting models of human development and behavior and required to choose between them or hopefully integrate them. "Basic to the practice of medicine," write Richmond and Lustman, "is a comprehensive view of the human organism and its relationship to the internal and external environment." Needless to say, these separate models do not offer the student any such comprehensive view of the human organism.

It is clearly the faculty's responsibility to develop and encourage a comprehensive clinical model and to build a curriculum around it. I have frequently noted at conference workshops that such a model often emerges spontaneously after a day or two of the most conflicting discussions. Within the confines of a medical school, however, where knowledge generally takes a second or third place compared with department territoriality and individual power quotients, the difficulty in working out such a model is always considerably greater.

The incorporation of behavioral science and biobehavioral knowledge into the medical curriculum will undoubtedly mean that the disproportion of molecular-cellular time in the curriculum will have to be curtailed - even as the heralded place of anatomy in the curriculum has given way to the growth of other contributions to medical practice. The structure of the medical school will also come in for change, but probably not until present day medical students, who will shortly make up future medical school faculties, will be prepared to make, and feel both secure and effective with, those changes.

Historically, behavioral scientists were often brought into medical schools under the support of departments of psychiatry. This had two drawbacks. First, over two thirds of existing members of the hard-core clinical and basic science departments have negative attitudes towards psychiatry as a discipline, and second the knowledge and techniques of behavioral science are more broadly applicable to medical problems in general, rather than confined to psychiatry. Following this dilemma, we are seeing two new trends emerge. Departments of pediatrics are showing increasing interest in incorporating behavioral scientists into their teaching and research activities. It is doubtful that this departmental utilization of behavioral scientists will prove any more feasible than that attempted by psychiatry. Furthermore, one suspects that pediatricians, who only rarely show a capacity for cooperative activities with child psychiatrists, are endeavoring to utilize behavioral science approaches in place of those of child psychiatry. This could only result in a more fragmented, rather than unified medical curriculum. We need new conceptual models, not the discarding of older but valid knowledge and methods. (115)

Another development that would narrow the necessary contributions of behavioral science to medical schools is the growing number of new departments of community health and medicine. Since federal support for the activities of such departments is generally contingent on the utilization of behavioral scientists, a tendency will be to incorporate behavioral scientists into such departments, and to look upon their presence in the community area as fulfilling their functions in medicine. In my opinion this would be a mistake while community health faculties and teaching will require the cooperation of behavioral scientists, one might legitimately question their narrow confinement to this one aspect of medicine, and their subordination to clinicians.

An historical perspective is also useful in considering the changes with which medical schools are now faced. Every advance in medical knowledge and skills has ultimately acted as a brake or hindrance to the next advance. Pasteur's germ theory of the origin of disease, together with Koch's postulates led first to the development of the science of bacteriology, then to immunology, which put medicine itself on a scientific basis. Nevertheless, the germ theory of disease played a role in resistance to the theories and demonstrations by Manson, Ross and Grassi supporting the mosquito-vector transmission of malaria. Residues of "germ theory" interfere even today with developments supporting the contribution of emotional factors to illness, chronic degenerative diseases and psychosomatic disorders. Virchow's cellular pathology initially contributed to the advance of medicine, but also prevented many physicians from seeing their patients as whole persons - patients whose "psyche" could contribute as much to disabilities as germs and cellular pathology. While the 1925 Flexner report did much to create medical schools of scientific excellence, and a necessary research orientation with eventual fulltime basic science departments in microbiology, biochemistry, etc., that very "scientific excellence" and basic science strength has distorted the medical curriculum. Whereas pestilential, viral and bacterial diseases prevail in underdeveloped countries, degenerative illnesses are responsible for the majority of deaths in medically advanced countries. Somehow society's most pressing health problems were overlooked in the shift from the anatomical dissection to the biochemical analysis of man.

I have suggested that the development of the biological basis of medicine which followed the Flexner Report was narrowly confined to that half of biology designated as functional biology, while the other half - evolutionary biology - was neglected. Half a loaf may be better than none, but knowledge of half of man's biology can never provide an adequate basis for medical practice. Nor should it be overlooked that the most fundamental advances in medicine have been derived from increments and refinements of knowledge in human biology. (116) The practice of what is euphemistically referred to as "humanistic medicine" will not cope with this situation. Only a return to the totality of human biology will do so.

SUMMARY

This paper outlines the need for a biobehavioral curriculum to bridge the behavioral science role in medicine. It points out the fallacy of utilizing functional biology as a basis of medical practice, to the almost complete exclusion of evolutionary biology. It further suggests that no simple addition of behavioral science time in the curriculum will solve the larger problem which medicine faces today - namely, the development of a comprehensive view, or expanded clinical model of the human organism, which incorporates a behavioral science understanding of man.

A knowledge of the phylogenetic and ontogenetic aspects of the neuromuscular system, which lies at the heart of the mother-infant relationship, is essential for an understanding of the phenotypic modification of man which is termed character structure. A biologic understanding of character structure is in turn necessary (a) for establishing a bridge between the functional, biological processes normally emphasized in the curriculum and the behavioral sciences, and b) for bridging the continuing rift between the hard-core clinical areas of medicine, and the soft-core areas of psychiatry and psychoanalysis.

Relevant materials may be drawn from the areas of a) ethological research and concepts; b) the prenatal origins of vertebrate and human behavior;

c) the postnatal neuromuscular maturation of the infant and child; d) neuromuscular aspects of emotional behavior; e) the role of emotions in maturation and development; f) the interrelationships of behavior, metabolism and physiology, as well as the shared homeostatic and heterostatic functions of behavior and the autonomic nervous system; and g) the interrelationships of biological clocks, rhythms and behavior.

An adequate curriculum is but one of the formidable problems which medicine faces. Existing medical school structure has not been able to cope with the information explosion in the biological, behavioral or medical sciences. Some implications and comments regarding the introduction of behavioral scientists, the formation of behavioral science departments, etc., into medical schools, are also discussed.

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THE TEACHING OF ECONOMICS IN SCHOOLS OF MEDICINE

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Economics and Medical Education

Background

In June 1969 the National Center for Health Services Research and Development contracted with the American Sociological Association to undertake a study for teaching behavioral sciences in schools of medicine. The original scope of the study was designed to include anthropology, psychology, and sociology. During the second year of the study the sponsor decided to expand the scope of interest to include behavioral biology, economics, and political science. The author agreed to prepare a position paper on the teaching of economics in schools of medicine.

The National Center for Health Services Research and Development requested that the author complete six specific tasks. The first three tasks are general and serve to outline the scope of the position paper on the teaching of economics in schools of medicine. Specifically, the author was requested to (a) draft a model curriculum for the teaching of economics in schools of medicine; (b) rank the content of the curriculum into categories of essential, desired, and specialized; and (c) discuss the rationale for the selection of content and its ranking.

The remaining tasks were presumably designed to coordinate the consideration of economics with the specific study for teaching behavioral sciences in schools of medicine. The contractor developed a self-study protocol and seven medical schools agreed to participate in the study by undertaking a self-study of the Behavioral Science Program at their school. The self-study was designed to include consideration of the behavioral science program in terms of its social and historical context, current teaching activities, staffing and facilities, objectives of the program, an evaluation of the program and a variety of other relevant considerations. The fourth specific request was for (d) a disucssion of sections of the self-study protocol insofar as they impinge upon the proposed content and procedures.

Next the sponsor asked that the author (e) discuss the proposed curriculum relative to the curricula which, to his knowledge, is currently offered in medical schools. The author's prior knowledge was limited to an exceedingly small sample of medical schools and individuals who taught courses in medical schools. Fortunately, the project staff of the general study had undertaken a survey of course offerings of medical schools in the United States and Canada. The project director provided the author with a list of schools which specifically mention courses involving economics in some form.

Finally, the author was asked to (f) correlate his paper where appropriate with a recent statement of the Economics Panel of the Behavioral and Social Science Survey. This statement was published as Economics: Behavioral and Social Science Survey by Prentice-Hall in 1970.

Introduction

Economics is the science of scarcity. The relevance of economics derives from the fact that on the one hand productive resources are exceedingly scarce while on the other hand the wants of men and society are virtually unlimited.

Even the most affluent society is faced with the basic economic problem of how to allocate scarce resources. What goods and services should be produced? Which members of society should receive what goods and services? These questions are serious ones because the choices are real ones. A society can choose from among alternative allocations of resources. A society can choose to have more of certain goods and services and less of other goods and services. And a society can choose to alter the pattern of distribution of the goods and services produced over its members and/or over time. These choices are relevant at virtually all levels of aggregation. The magnitude of the problem is different but the nature of the problem is the same.

Productive resources are usually classified as land, labor, and capital. Land includes all those resources which are found in a natural state; labor includes any human effort; and capital is any produced means of production, that is, anything that is used in the production process that itself was produced at an earlier stage.

In any context, these resources are limited. In any context, we need to concern ourselves with how much we get from using up scarce resources. In a general sense we have to be concerned with which and how many of the wants of men and society are satisfied by a particular allocation of resources. In the last analysis our objective is to use resources in such a way that we get the most out of them is terms of the satisfaction of wants.

The United States is a relatively affluent society and has an enviable endowment of resources. In rather rough orders of magnitude the amount of land as a resource in the United States can be approximated from its 3 million square miles. The labor force of the United States is approximately 80 million persons. The capital stock of this country, the produced means of production, the machinery, buildings, inventories, and the like, is something in the order of 2 to 3 trillion dollars. But even this endowment of resources is scarce relative to the collective wants of the 200 million plus members of the population of the country. The prevailing allocation of these resources generates an output of goods and services with a market value of approximately $1,000 billion. This output represents the greatest absolute and per capita level of production attained in the history of the world--yet consider the unsatisfied wants in this nation.

This is a rather simplistic overview of the economy of the nation but it does serve to outline the framework of the concern of economics. The resources of the nation are limited. The nation is faced with a series of choices. The most obvious question is whether or not the existing allocation of resources is the appropriate one to produce the particular mix of goods and services being produced. If an alternative allocation of resources would allow for an increase in output then the prevailing allocation is an inappropriate one.

A somewhat more complex question is whether or not the prevailing mix of goods and services is the most desirable mix. Would the society be better off in some sense if the mix of output were characterized by more of certain goods and services and less of other goods and services?

An even more complex question is whether the present pattern of distribution of goods and services among the members of the population is an appropriate one. Would the society as a whole be better off in some sense if a redistribution among the individual members of the society took place.

The first two questions refer to the relative efficiency of the allocation of resources. The last question refers to the equity of the distribution of the produce of those resources.

All of these questions are relevant as well for the health services sector of the economy. In fact, a significant proportion of the nation's scarce resources are employed to produce health services.

In fiscal 1970 the aggregate national health expenditures were some $67.2 billion. This represented some 7.0 percent of the market value of total output--the Gross National Product. Health care expenditures have been rising dramatically in recent years. Expenditures in fiscal 1970 were two-and-one-half times greater than they were in fiscal 1960 and five times greater than they were in fiscal 1950. The growth in the relative share of health care expenditures has been equally dramatic. In fiscal 1950 health care expenditures represented some 4.6 percent of Gross National Product, in fiscal 1960 they were some 5.3 percent of GNP, at present they exceed 7 percent of GNP.

Given the volume of the nation's scarce resources employed, the allocation of resources to and within the health care sector should be of signal concern. Is the present allocation of resources to the health care sector an appropriate one? Could we get the same output of health services for less resources, or could we get more health services for the same resources, are alternative ways to phrase the question. If the answer to these questions is yes, then the existing allocation of resources is clearly an inappropriate one.

Of course, in general, consumers do not want health services *per se*, the real want is for better health. Medical care or health services are desired only in as much as they contribute to the satisfaction of a more basic want. Is the prevailing mix of goods and services in the health care sector the most desirable mix? Would the society be better off in some sense if the mix were characterized by more of certain goods and services and less of others? Could we have the same health with fewer resources if we had more outpatient visits and less hospital inpatient days, for example? A related question, of course, is would society be better off if there were more or better housing and nutrition and less health services?

Finally, of course, there is the most complex question of whether the society would be better off in some sense if the health services were redistributed among the individual members or groups within the population.

These questions are not unique to health care, of course. In a basically market economy the allocation of resources is generally left to the interaction of buyers and sellers in the market place. External intervention is required when society decides that the pattern of distribution is inappropriate. External intervention is also allowed for when the allocation of resources is quite inappropriate.

Each time a particular good or service is produced some of the scarce resources are used up. The production of more of one good implies that less of some other good can be produced since the resources used for the one cannot be available for the other. Hence, the "cost" of any good or service is appropriately described as the foregone opportunity of using the resources to produce something else--the "opportunity cost." This, in the jargon of economics, is the supply side of the problem of resource allocation.

On the demand side, consumers go into the market with purchasing power to express their preferences for certain goods and combinations of goods. In effect, the purchasing power of consumers represents their "command" over resources. By expressing their willingness to purchase a particular good, consumers indicate the "value" to them of the resources used in the production of that good.

This is the general framework of the market solution to the research allocation problem. Since the basic objective is to utilize resources in such a way that we get the most out of them in terms of the satisfaction of wants, a reasonably well working market can do a reasonably good job of allocating resources.

The profit motive suggests that producers will try to maximize the difference between what consumers are willing to pay for their products and what they in turn have to pay to acquire the resources to produce these products. It seems reasonable to expect that consumers, on the other hand, will purchase those products which tend to maximize their satisfaction. This interaction will tend toward a balancing of opportunity cost and value in consumption. Since opportunity cost reflects resource scarcity and value in consumption reflects want satisfaction such a balance is appropriate.

This is admittedly a somewhat simplistic overview of the process but it does serve to point up quite well the special relevance of concern for resource allocation in the health field and the importance of the science of scarcity for medical education.

Staying with the simple overview, what happens when there is no profit motive acting as an incentive to producers to minimize the opportunity cost of their output? What happens when the consumer is not really able to judge the capacity of a product to contribute to his want satisfaction? How is opportunity cost to be compared with value in consumption? How indeed is the problem of resource allocation to be solved?

A consideration of the central role of the physician in the decision making process in the health sector suggests that he has a critical role to play in solving the problem of resource allocation.

Hospital care is by far the largest single industry in the health care sector. In 1970 expenditures on hospital care were some $25.6 billion. Total employment in the hospital care industry was 2.6 million or some 3.3 percent of the total civilian labor force in the United States. Something in excess of $36 billion of capital was also employed in the hospital industry. Decisions invloved in the production of hospital services have significant implications for resource use.

Physicians do not make all the decisions regarding the production of hospital services but they do make many with significant implications. The decision to hospitalize or not to hospitalize is usually within the control of a physician. The length of stay is generally decided by the physician. Since the physician usually determines the treatment modality a variety of decisions that directly affect resource use are under his direct control. Do physicians take resource use or opportunity cost into account? In some cases perhaps they do, in many cases there is evidence that they do not. Would the physician make the same decisions concerning hospitalization, length of stay, and treatment modality if he were aware of the opportunity cost of his decisions? This seems a reasonable question.

Physicians' services is the second largest component of national health expenditures. In 1970 some $12.9 billion was spent on physicians' services. In addition to the physician manpower employed in this industry directly, just under 200,000, nonphysician employment was almost 300,000, and $7.5 billion is a conservative estimate of the capital employed by physicians in the provision of physicians' services. Obviously the physician makes decisions with significant resource use implications in his own practice. What tasks do physicians perform? What tasks do nonphysicians perform? Should the production of physicians' services be more labor intensive? More capital intensive? Perhaps the physician pays more attention to opportunity costs in the context of his own practice, but does he pay close enough attention?

The physician has a central role in the decision making process that affects resource allocation in other parts of the health services sector as well. The drug industry and nursing home care are obvious examples.

The size of the health care sector, the proportion of the nation's resources devoted to the production of health services, the special nature of much of the sector, and the central role of the physician in the decision making process taken together suggest that physicians should be much more aware of the problems of resource allocation. The science of scarcity should be an integral part of the education of physicians.

Economics in the Medical Curriculum

The primary purposes of this paper were to draft a model curriculum, rank the content of that curriculum in terms of priorities, and discuss the rationale for the content and its ranking. Actually, each of these tasks was begun in the previous section. In this section we shall outline and identify more specifically the concepts and applications of economics that would be appropriately included in the medical curriculum. In the next section we shall attempt to rank the content in terms of the priorities of inclusion and further develop the rationale for the inclusion of economics in the medical curriculum.

This is obviously not intended to be a treatise on economic theory. Rather, we will only attempt to present a broad overview of the relevant concepts. In a sense this is more a glossary of relevant terms.

Every graduate of medical school should be exposed to the general concepts of economics and should be made aware of the implication of the economics of medical care or health services. Many entering medical students have had prior formal academic exposure to the discipline of economics, a few have had courses or seminars that involve the application of economics to medical care and health care problems. Medical schools ought to make provisions for those students without prior exposure to gain exposure during their medical education.

A model curriculum would build upon a base of a formal introduction to the basic concepts of economics. Economics is concerned with the allocation of scarce resources. Because the resources are scarce a number of choices have to be made. Decisions to allocate resources involve choices among alternatives. The decision to produce one good implies the resources are not available to produce alternative goods. The next best alternative foregone is the real cost of production--the opportunity cost. These are all fundamental concepts.

Supply and demand are familiar terms. Students should learn the theories of production and consumption. Of particular concern should be the concept of alternatives in production and consumption. In most cases there are a number of different ways to produce a particular good or service. There are substitution possibilities in production. Capital can be substituted for labor, skilled labor can be substituted for unskilled labor, and so forth. The choice of production technique should reflect the relative scarcities of different resources. There are also substitution possibilities facing the consumer.

The interaction of supply and demand, the theory of markets, is basic material for economic analysis. Market imperfections and market failures will probably be of particular interest to medical students concerned with the broader social aspects of medicine.

Economic efficiency has a particular significance. Often economic efficiency is confused with technical efficiency by the uninitiated. Efficiency in production requires that resources are allocated in such a way that no change could result in an increase in the output of any one product without a decrease in the output of at least one other product. Efficiency in exchange (consumption) requires that goods and services are distributed in such a way that no change could result in any one person being made better off without at least one other person being made worse off. Overall efficiency requires not only efficiency in production and exchange but further that the opportunity cost of producing each good is equal to its value in consumption.

These are the basic concepts of economics. A course in basic economic principles should be at the core of a model curriculum. A number of additional blocks can be added to the base. One such block that is of immediate concern would be the application of the basic concepts to the health care sector.

The decision to allocate resources to health implies the decision not to allocate resources elsewhere. Hence to increase the allocation of resources to health is to decrease the allocation of resources to education, housing, or other sectors. The opportunity cost of more health will be less education, less housing, or less of something.

The same is the case for allocations within the health sector. If more resources are to be used for the provision of acute care less resources will be available for the provision of chronic care, and so forth. The opportunity cost of an additional day of stay for maternity cases may well be a somewhat lower level of intensive care for cardiac cases, and so forth.

Much can be done with the application of supply and demand to the health sector. The supply of medical care affords many substitution possibilities in production. The substitution of various types of medical manpower within the production process is a favorite example but there are many others. Outpatient care, home care, and visits to a physician's office can be substituted for inpatient care in certain cases, for a further example.

What are the factors that affect the demand for medical care? One of the most obvious with a timely implication for public policy is insurance.

The theory of markets can contribute significantly to an understanding of the health care sector. What is the market for medical care? How does this market function? Actually, the health care sector is composed of a number of markets, many of which are interrelated.

If anything characterizes the health care sector in an economic sense it is the number of market imperfections and the magnitude of market failures. Recognition of the existence of market imperfections and failures and more especially an awareness of their implications can provide a significant insight to the problems of the sector.

How efficient is the health care sector? In what ways might the level of efficiency be raised? These are the questions that matter in the last anaylsis.

An application of the basic concepts of economics to the health care sector can provide the medical student with a stimulating educational experience. It would also increase his capacity to perform within the system.

Still another block in a model curriculum would be a course which systematically analyzed the economic structure of the health care sector. Such a course would parallel the industry studies of the sub-discipline of economics known as industrial organization. The major industries within the health sector could be studied in depth. In essence this carries the application of economics to the health care sector somewhat further. In such a course it is possible to analyze the structure, conduct, and performance of the major industries within the sector--in effect an application of the basic principles of economics in more depth and in more detail.

Because the study of markets and market behavior is central to economics, market imperfections and market failures have concerned economists for some time. The field of public finance is a well developed subdiscipline. External intervention to correct imperfections or to overcome market failures is a primary concern of the field of public finance.

Public health certainly implies a public role in the health field.

When public health was essentially concerned with sanitation and then infectious diseases the public role was more limited. In recent years the public role has been expanded to include concern with the production, delivery, and financing of personal health services. This expanded public role was undoubtedly stimulated in large part by the number and magnitude of market imperfections and market failures within the health care sector. This aspect of the economics of health services suggests additional blocks in a model curriculum.

Health Planning is an area of concern that has recently received support from many quarters. From an economic point of view planning is an alternative to the market as a mechanism for allocating resources. A major problem that planners must overcome is the lack of market information in the form of prices to reflect opportunity costs of resources and values of goods in consumption.

Cost-benefit analysis has been around longer than health planning, but it is an important planning tool. Essentially cost-benefit analysis is designed to serve as a criterion for resource allocation. The object is to identify and measure the costs and benefits of a particular program. Programs can then be ranked by the excess of benefits over costs for resource allocation decisions. Unfortunately, programs which are usually subjected to cost-benefit analysis are those which are to be undertaken because the market is incapable of providing the particular good or service. This means that in most cases the need for the analysis is coincident with the lack of required information to complete it. But the resource allocation decisions have to be made. Choices have to be made anc cost-benefit analysis can be a valuable input to the decision making process.

In the past health programs (and other programs as well) were all too often continued without any systematic attempt to determine their worthwhileness. In the last few years funding agents, particularly the Federal Government, have made it clear that evaluation of health programs was relevant and presumably would be considered in the funding process, which is after all a resource allocation decision process.

Taken together these several blocks can serve as a model curriculum. First, an introduction to the basic principles of economics. Second, a general application of economics to the health care sector. Third, an analysis of the economic structure of the health care sector. Fourth, a series of applications of economic analysis specific to the public role in the health care sector.

Curriculum Content: Ranking and Rationale

At this point we must practice what we preach. It may be tempting to simply conclude that all four blocks outlined above are important and ought to be required in the curriculum, but the time of medical students is a scarce resource and it too must be allocated efficiently.

Perhaps the optimal solution would be to make each of these four blocks available in the curriculum, explain the relative importance of each to the student, and let him balance the opportunity cost against the value in consumption.

Be that as it may, we have been asked to rank the curriculum content as "essential," "desired," and "specialized." These are somewhat arbitrary terms but the intent of the request is clear enough. As a first approximation we would classify an introduction to the basic principles of economics as "essential." It is certainly essential in the sense that each of the other parts of the model curriculum build upon it.

A general application of economics to the health care sector would be our second order of priority. It is most likely that most medical students would find this a stimulating educational experience. Further, the primary payoff of including economics in the medical curriculum may derive from this source.

For a number of years we have offered a seminar that deals in general with the economics of health care. Among the participants have usually been a number of physicians and medical students. The first session of the seminar is designed to deal with the goals and objectives of the health care system. The medical participants often respond with, "the highest quality medical care for anyone who needs it," usually implicit and occasionally explicit is the qualification, "whatever the cost."

As the seminar progresses, and the concept of scarcity is discussed, and it becomes obvious that the decision to allocate resources to health implies the decision not to allocate resources elsewhere or that the opportunity cost of an additional day of hospitalization for one patient may be nonhospitalization of another patient, there is a marked change in the medical participants' perspective. Given the central role of the physician in the decision making process in the health sector, such a change in perspective is probably desirable.

The remaining two blocks are somewhat specialized. A select group of medical students might desire to pursue the application of economics to the health sector somehwhat further. A course which offers an in depth and detailed analysis of the economic structure of the health care sector should be available for them. The author has offered such a course for the past few years that is taken primarily by physicians and medical students. In fact it has been possible (necessary) to combine the introduction to basic economic principles with an analysis of the economic structure of the health care sector in a one semester course. The results have been encouraging and the student reaction is quite favorable.

The final block, a series of applications of economic analysis specific to the public role in the health care sector, is of special interest to those students who intend to pursue careers outside the traditional private practice of medicine. Certainly those who intend to enter the field of public health will have an interest, but so too will those who intend to pursue careers in a variety of areas for which health planning, health evaluation, and the like will be more relevant.

Economics and Medical Education and the Self-Study Protocol

The self-study outline was presumably devised to provide a format for a systematic response specific to a single program. Thus, at one extreme, one could take the position that there are no sections of the protocol that are relevant for a general discussion. At the other extreme, it would be equally appropriate perhaps for one to take the position that since any given medical school could theoretically be asked to complete the same self-study for the teaching of economics each section of the protocol is relevant. For present purposes there is something to be gained by taking an intermediate position.

Table 1

Self-Study Outline
Behavioral Science Programs in Medical Schools

I	Overview of Behavioral Science Program
II	Social and Historical Content of the Behavioral Science Program
III	Current Teaching Activity
IV	Current Staff and Facilities
V	Formal and Informal Objectives of the Behavioral Science Teaching
VI	Illustrative Learning Experiences
VII	Evaluation
VIII	Additional Descriptions of Your Teaching Program
IX	Five-Year Plans
X	Advice to Administrators
XI	Preparation of this Self-Study
XII	Supporting Documents

No attempt will be made to respond in kind to each item within the complete outline. Rather, it should serve the present purpose to provide a normative response to the general outline.

In general the basis for the following response assumes that the general principles presented in the introduction and the model curriculum outlined are accepted as appropriate. The specific course material referred to in the response is essentially that offered by the author and others and available to and taken by a number of medical students and physicians.

(1) Overview of Economics Program:

Every graduate should be exposed to the general concepts of economics and should be made aware of the implication of the economics of medical care or health services. Since the model curriculum builds upon a base of a formal introduction to the basic concepts of economics a basic course should be offered for those with no prior exposure. The basic course offered in the arts and sciences component of the university will often suffice but if there is sufficient demand it may be more appropriate for a special section of that course to be offered in the medical school.

A course that is concerned with the application of the basic concepts of economics to the health field is central to the economics program. A seminar is a preferred mode for offering this course.

In addition the economics program should include certain "elective" courses such as, (a) The Economic Structure of the Health Sector, and (b) The Economics of the Public Role in the Health Sector.

(11) Social and Historical Context of the Economics Program:

A number of factors have interacted in the social and historical context of the economics program relevant for a medical school. The relative importance of health and medical care as a sector of the economy is an obvious factor of concern. Further, since the health sector has been growing dramatically in recent years, it is a factor of increasing relevance. If one considers the fundamental questions of economic analysis--What goods are to be produced? How are these goods to be produced? Who should receive which of the goods produced?--they are of signal concern in the health and medical care field.

In recent years there has been concern with the relative position of this nation in terms of life expectancy, infant-mortality rates, age adjusted mortality rates and the like, particularly in contrast with the relative proportion of national resources devoted to the production of health care. This concern has contributed in no small way to the introduction of economic considerations to health problems.

A number of questions are being asked about the production and provision of medical care that in the past were not so often raised. Many of these questions have a significant economic content. Medical students and others are increasingly aware of the economic aspects of problems in the health sector and consequently increasingly conerned with them.

Just as there are important questions that concern what is being produced, there are questions that concern the production process per se. Is the present organization of the health care production and delivery system an appropriate one? Is it an efficient production process?

The rate of inflation of medical care prices, particularly the cost of hospital services, has been under scrutiny for a number of years. What causes this inflation? Is it symptomatic of a basic inefficiency? How can the rate of inflation in the health sector be moderated? These and other questions related to the organization, delivery, and financing of health services concern the health professionals as well as others and serve to intensify the significance of the role of economics within medical education.

The distribution of health services is an additional area of concern. Certainly the legislative history of the past decade is indicative of a degree of dissatisfaction with the pattern of distribution that has prevailed in the recent past. This is a nation characterized by poverty among affluence. This characteristic is perhaps nowhere as obvious or as burdensome to the social conscience as in the realm of medical care.

It is certainly the case that in recent years some in medical schools have become more concerned with the broader social aspects of health and health care. As this concern has expanded it has been reflected in part through a recognition that the behavioral and social sciences have a contribution to make within the context of formal medical education. Neither the concern nor the recognition is ubiquitous either among medical schools or within medical schools but the trend is distinctly apparent. It is really within this context that the economics program will evolve. As the concern with the broader social aspects of medical education leads in turn to a more clear recognition of the potential contribution of the behavioral and social sciences, the role of each will expand.

(III) Current Teaching Activity:

At this point it seems appropriate to outline four courses that are currently offered that coincide roughly with components of the model curriculum outlined above.

1. "The Economics of Health Services"

This course is designed to provide an examination of some of the economic aspects of the production, distribution, and organization of health services. The basic approach in the course is to provide an introduction to economic analysis and an application of that analytical framework to health services. In essence this course combines the introduction to basic economic principles with the systematic analysis of the economic structure of the health care sector. As such it represents both the first and third blocks in the model curriculum. It is not necessary to combine these two blocks into a single course but since the former is essential for the latter it has been a reasonably efficient combination. In practice it has usually been the case that approximately one-half of the students enrolled in the course (primarily medical students and physicians) have had prior exposure to basic economics, and one-half have not. Hence, the first part of the course serves as an introduction to some and a (welcome) review to others.

The general outline of the course is as follows:

I. Economic Analysis

   A. Introduction
   B. Supply, Cost, and Production
   C. Consumer Theory
   D. The Theory of Markets
   E. Economic Efficiency

II. The Scope of the Health Services Sector

   A. An Overview
   B. The Magnitude of the Health Services Sector

III. The Economic Organization of the Health Services Sector

   A. The Product of the Medical Care Sector
   B. The Market for Medical Care Facilities
   C. The Market for Physicians' Services
   D. The Markets for Other Medical Manpower
   E. The Markets for Other Goods and Services

IV. The Financing of Medical Care

V. Planning for Medical Care Services

This general course outline represents a basic, but flexible, framework for discussions and analysis throughout the course. A copy of the course outline and reading list is included in the appendix.

2. "Economic and Administrative Issues in Medical Care"

This course is designed to expose the students to an application of the basic concepts of economics to medical care and health care problems. This course is offered as an interdisciplinary seminar and the participants come from a variety of academic and professional backgrounds and include medical students and physicians. In essence this course is a possible form for the second block in the model curriculum. No systematic effort is made to "teach" basic economics, and many students start the course with no previous formal exposure to the field.

The general outline of the course is as follows:

I. Goals and Objectives of Medical Care

II. Constraints

  1. Economic
  2. Political
  3. Socio-cultural
  4. Technological

III. The Distribution of Medical Services

  1. Geographical
  2. Population Groups

IV. Poverty and Health

V. Cost and Inflation

VI. The Quality of Medical Care

VII. Alternative Health Care Systems

VIII. Financing Systems

IX. Planning

X. Student Policy Reports

Each of the major topics in the outline is the subject matter of a separate seminar. The participants are expected to read certain background material and come to each session prepared to discuss the topic from relevant points of view. The varied backgrounds of the participants in the actual seminars contributes significantly to the general level of discussion, to the overall interest of the participants, and to the general success of the course.

In general it would be desirable to offer such a course as an interdisciplinary seminar. It could, however, be offered essentially as a medical school seminar as the second block of the model curriculum. As evidence it might suffice to note the varied interests of the present generation of medical students and their increasingly varied undergraduate academic backgrounds.

The last topic of the general outline has been particularly sucessful. The students in the course were grouped into a number of task forces. Each task force dealt with a specific significant issue in health or medical care. The task forces were charged with investigating the complexities of the issue, analyzing the several policy alternatives for dealing with the issue, and outlining the implementation of a preferred policy alternative. Each task force made a formal presentation and defended its findings in the context of a critical review by the other participants in the course. Among the task force reports have been:

1. Alternative Approaches to Health Manpower Allocation
2. Criteria for Effectiveness of Consumer Participation in Health Delivery Programs

3. Evaluation of the HMO Proposal
4. A Cost-Effectiveness Look at Neighborhood Health Centers
5. Evaluation of Alternative National Health Insurance Proposals

A copy of the course outline and reading list is included in the appendix.

3. "Economics of American Health Care Policy"

This course is also designed to expose the students to an application of economics to health care problems. It is also offered as an interdisciplinary seminar and the participants come from varied academic and professional backgrounds. There are two significant differences between this course and the previous one. First, this seminar invloves a formal presentation by a series of speakers. Each presentation is usually followed by a general discussion but this is obviously a quite different format from that of the seminar described above. Second, it is usually expected that the students enrolled in this seminar have had prior formal exposure to at least the basic principles of economics.

The general outline of the course is as follows:

I. Physicians
II. Paramedical Personnel
III. Cost and Productivity Measurement
IV. Insurance and Prepayment
V. Medicare and Medicaid
VI. Group Practice and Integrated Provision Schemes

VII. The Role of the Market and Planning

VIII. Cost Benefit Analysis

IX. Hospitals and Nursing Homes

Each of the topics is the subject matter of a separate seminar. The participants are expected to read certain background material but a formal paper or presentation is made on each topic by someone with particular expertise in the subject area.

This course or a similar one could serve as the second block in the model curriculum. It would be especially appropriate if the "essential" first block were available as a prerequisite.

4. "The Economics of Health Planning"

This course is relatively new. It was developed by the author only last year in response to a perceived need for a course that dealt more specifically with the economic aspects of the public role in the health sector.

The course was designed to provide an introduction to planning as an alternative to the market as a mechanism for resource allocation. The course is roughly divided into three parts. In the first part of the course there is an attempt to introduce the fundamentals of macro-economics, especially as they relate to income determination, investment, economic growth, and stabilization policy.

The second part of the course involves a survey of national economic planning. Essentially the survey is designed to familiarize the students with the potential range of economic planning from that that prevails in the Soviet Union, for example, through French State Planning, to that that is characteristic of a basically market economy such as the United States.

The third part of the course is designed to concentrate on health planning and the relevant tools available for the planning effort.

The general outline of the course is as follows:

I. Introduction to Macro-economics

    A. Income Determination
    B. Economic Growth
    C. Fiscal and Monetary Policy

II. National Economic Planning

    A. Centralized Planning
    B. State Capitalism
    C. Decentralized Planning

III. Health Planning

IV. Cost-Benefit Analysis

    A. Problems
    B. Prospects
    C. Specific Applications

V. Evaluation of Selected Health Programs

As is the case with most new courses, at least three general principles obtained. First, the instructor probably learned more than the students. Second, the instructor was not completely satisfied with the way the course turned out. Third, the course will be different the next time it is offered. On balance, however, this course, or rather a similar course, is probably an appropriate one for medical students who have a particular interest in the public role in the health field. It could be an appropriate course for block four in the model curriculum. A copy of the reading list for the course is included in the appendix.

(IV) Current Staff and Facilities:

There is really no particular benefit to derive from a specific response in this category. A couple of general principles might be cited. First, it is probably not appropriate for non-economists to try to introduce medical students to basic economic concepts or to the application of economics to the health care sector. In some instances attempts have been made to include an economic content to certain courses in medical schools by faculty from disciplines other than economics. In general these attempts have not been successful. Second, it is probably not sufficient to attempt to incorporate economics into the medical curriculum by means of an occasional lecture by a visiting fireman, even if the fireman happens to be a professional economist.

(V) Formal and Informal Objectives of the Economics Program:

Essentially we return here to the basic rationale for inclusion of economics in the medical curriculum. The primary objective of the economics program is to expose the medical students to the general concepts of economics and make them aware of the implication of the economics of medical care and health services.

The magnitude of the health care sector, the proportion of our scarce resources devoted to health care, the special characteristics of the health sector, and the central role of the physicians in the decision making process taken together suggest that physicians should be more aware of the problems of resource allocation. The science of scarcity should be an integral part of the education of physicians.

The remaining sections of the self-study protocol do not really require any particular consideration in this general response. (Section XII deals with supporting documents such as course outlines and reading lists. As indicated above the course outlines and reading lists for each of the four courses discussed are included in the appendix.)

The Proposed Curriculum and Existing Curricula

Short of undertaking a rather complete survey of the economic offerings of medical schools, any comparison of the proposed model curriculum to the curricula which are currently offered in medical schools would at best be incomplete and at worst superficial and possibly misleading. Given this disclaimer there is a variety of evidence upon which to base a rather general, albeit tentative, comparison of the proposed and prevailing curricula.

The author has a prior knowledge of a small sample of medical schools and individuals who have taught related courses in medical schools. In addition, the author has discussed the question with a few colleagues with similar knowledge. The general consensus seems to be that appropriate exposure to basic economic concepts and to the implication of the economics of health and medical care is not widely available in medical schools. There are very few courses, if any, which are offered in medical schools that approximate the depth of content implicit in the model curriculum.

Although the field has expanded rapidly in recent years, the number of academic economists who are in the subdiscipline of the economics of health or medical care is still somewhat limited. Of this limited number some are in departments of economics, a few are in schools of public health, and a few are in medical schools. There are certainly not full-time adademic eonomists on the faculties of most medical schools. This phenomenon tends to support the general consensus that appropriate exposure to basic economic concepts and the application of economics to the health field is not widely available in medical schools.

Some medical schools have appointed economists to their faculties with an apparently part-time commitment. In some cases academic economists hold joint appointments in the faculties of medicine and other faculties of the university. These are relatively recent practices and should serve to increase the exposure of medical students to economic concepts and applications. It is unlikely, however, that a single economist on a part-time basis will suffice to staff the full range of the model curriculum.

There are alternatives, of course. The four courses outlined in the preceding section are available within other parts of the university and open as electives on a cross registration basis to medical students. In effect, it is possible to offer the full range of the model curriculum without specifically providing it within the curriculum of the medical school. In practice, however, unless the model curriculum is part of the medical school curriculum the impact in terms of desired exposure is bound to be exceedingly limited.

Some direct information on economic content of medical school courses is available from a survey of course offerings undertaken for the Study for

Teaching Behavioral Sciences in Schools of Medicine. The project director provided the author with a list of medical schools which specifically mention courses involving economics in some form. This list is presented in Table 2. The list is obviously not complete, but it is probably representative.

A careful inspection of this list tends to reenforce the conclusion that exposure to basic economic concepts and the application of economic analysis to medical care and health care problems is not widely available in medical schools.

Table 2

Summary of Medical School Courses with Economics Content

University of Chicago

An interdepartmental required course on social medicine which considers system, economic, social and political influences on health care

University of California, San Francisco

Six departments contribute to the behavioral science elective offerings. The Department of International Health offers five courses, one of which is: Evolution of American Medicine, covering sociopolitical and socioeconomic factors influencing the growth of American medicine.

University of Alabama

Department of Public Health and Epidemiology gives a required course to 2nd year students dealing with how medical care is financed, among other topics.

Bowman Gray School of Medicine

In-depth interviews with patients "provide background for a consideration of how economic factors modify the response of the individual to the illness, physician, and treatment, among other factors.

St. Louis University

The Department of Community Medicine gives a required course to 2nd year students focusing on models for organizing delivery and financing of health care.

NY Medical College

Clinical pediatrics courses discuss the effects of socio-economic, environment, and emotional factors on the growth and development of children.

George Washington University

Department of Epidemiology and Environmental Health gives a lecture and seminar course on significant socioeconomic considerations in bringing total health to the community.

Temple University

An elective in Population Dynamics is offered which includes a consideration of economics.

University of Michigan

A program in Community Medicine has as its goal the development of an understanding of the significance of social, economic, and environmental factors in disease.

University of Arizona

The Division of Social Perspectives in Medicine addresses itself to increasingly complicated cultural, social, economic, legal and moral influences affecting the institution of medicine in American society.

Cornell Medical College

One of three courses required of first year students with behavioral science topics in Population Dynamics and deals with the biomedical, cultural, ethical, and socioeconomic aspects of population dynamics.

University of Colorado

Among electives offered to graduate and medical students: Economics and Political Determinants in a Health Care System. Electives in the Department of Psychiatry include Personality and Culture, examining anthropology, sociology, philosophy, economics, psychiatry and political science.

University of North Carolina

The medical clerkship in the 3rd year includes a 9-hour seminar on the Doctor and His Community, covering, among other things, medical care economics.

University of California, San Diego

A multidisciplinary core course in Social and Behavioral Sciences examines basic knowledge in medical economics and is taught by the Department of Economics (other material covered and taught by respective departments). One of the elective clinical courses offered in the 3rd and 4th years by the Department of Community Medicine emphasizes the importance of social, cultural, and economic factors on health and disease. The basic elective program offered by the Department of Community Medicine includes a course in Medical Ecology for 1st year students and discusses various aspects of the cultural, economic, psychological and physical environment.

University of California, Irvine

Elective 4th year course, Socio-Cultural Factors in Pediatrics deals with the "impact of family, community, cultural and economic conditions on the child (and) social factors hindering or aiding rehabilitation of the handicapped child." The Department of Medicine's first year course on the history of medicine presents a "survey of the historical and socioeconomic aspects of current medical practice."

University of California, Los Angeles

The depth elective in Obstetrics and Gynecology emphasizes the "physiologic, emotional and economic aspects of pregnancy, labor, and delivery and the problems arising from the mother-infant relationship."

University of Southern California

Required courses in the 2nd year include a course on Community Medicine, given by the Department of Community Medicine and Public Health. Deals in part with medical sociology, and the economics and politics of medical administration.

Yale University

Department of Epidemiology and Public Health offers courses for its graduate students that are open to medical students as well and include a seminar on medical economics.

University of Rochester

Required 1st year courses include Preventive Medicine which is broadly oriented around medical ecology dealing with particular areas of medical sociology, medical economics, environmental effects on health and health care systems planning, and Patient, Physician and Society. An interdepartmental course is also included which considers social issues in modern medicine, such as doctor-patient relationship, medical economics, and ethics.

Albert Einstein College of Medicine

Required courses include Community Health and Social Medicine dealing with the economics of medical care and the organization and delivery of health services.

Columbia University

Electives include Psychiatry course in Health Economics.

Georgetown University

The Department of Community Medicine and International Health deals with the "economics and sociology of medical and health problems" in its program.

Miami University

Electives in Epidemiology include economics of health care.

Michigan State

Overview of Medicine as a Social Institution seminar course includes economics of medicine in the United States.

University of Missouri

A required first semester course titled Human Ecology and Behavioral Science includes coverage of Economics and Politics under the subject of Health Care Delivery.

University of Connecticut

Introduction to Clinical Medicine, divided into ten units, includes one unit which involves a presentation of the economic factors relative to health care and legislation regarding health care.

University of Kentucky

The basic departmental required course is titled Health and Society. Within this course, in a seminar on Medical Care Organization, the topic of medical economics is treated.

Sources:
1. 1969-1970 catalogues of medical schools in United States and Canada.
2. Response of 69 medical schools to letter requesting information regarding course offerings.
3. Self-studies of Study for Teaching Behavioral Sciences in Schools of Medicine. (9 medical schools)

There are certainly no cases that imply that the full range of the model curriculum is available. In only one instance is there specific reference to a systematic introduction to basic economic principles. There may be others but it certainly does not appear to be the case. Most of the references imply that a small number of sessions of particular courses are given over to discussion of economic factors. Only a few cases can even be sympathetically interpreted to suggest that a major component of the curriculum includes a course that approximates the second block of the model curriculum. There is no case of a course that is designed to systematically analyze the economic structure of the health care sector.

The general impression that one gets from reviewing the list is that it is perhaps representative of the trend that was alluded to above. As the level of concern with the broader social aspects of health heightens there are certain courses and certain departments within medical schools that reflect this concern. One suspects that the impact of this concern on the curriculum follows a pattern. First, concerned medical school faculty who recognize the relative significance of economics, for example, try to reflect that themselves in their courses. When they recognize the relative significance and sophistication of the economic aspects of the problem they tend to invite economists to give a specific lecture or set of lectures in their courses.

This is certainly an appropriate trend. It undoubtedly preceded the appointments of economists to faculties in those medical schools that now have economists on their faculties. On the other hand, it is certainly the case that there is some distance to go before the prevailing curricula approximates the model curriculum.

Economics and Medical Education and the Behavioral and Social Science Survey

The editor of the Economics volume of the Behavioral and Social Science Survey summarized the goals and achievements of economics as:

> In summary, the long range goal of economics has been the understanding of the operation of the economic system. The acquisition of this understanding has been cumulative, and there now exists a well-established core of economic theory and an economic accounting framework which provides the economist with his basic working tools. The economist's methods of analysis have been used in a number of applied fields. Considerable success has been achieved in designing policies to improve the stability of the economic system and increase its efficiency in specific sectors. Currently, economics is beginning to be more responsive to the major social needs which are being increasingly recognized.

The economics of health is an applied field of economics. There are similarities between this applied field and other applied fields of economics: A particular case in point is the similarity between the economics of health and urban economics, for example. In general the objective of the application of economic analysis to the field of health is the same as the applications to other fields. Health is a specific sector and a significant sector and the economic system and hence society would benefit from a increase in the efficiency of the health sector.

There is much that remains to be learned before it can be claimed that we understand the operation of the health sector as an economic system. A major gap in theoretical knowledge is the real lack of a theory of nonprofit enterprise. Traditional economic theory does not really contain a satisfactory model of nonprofit behavior. There are empirical gaps as well. Much more needs to be known about the technical production relationships in health, for example.

Still there is much to be gained by applying economic analysis to the health sector. A number of questions remain to be answered. Is the present allocation of resources to the health care sector an appropriate one? Could we get the same output of health services for less resources or could we get more health services for the same resources? Is the prevailing mix of health services the most desirable mix? Could we have the same health for fewer resources if we had more ambulatory care and less hospital care, for example? Would the general level of health be higher if there were more or better housing and nutrition and less health services?

The real objective of including an economic content in the medical curriculum is to expose the future physician to the general concepts of economics and make him aware of the implication of the economics of medical care and health services. The future physician should concern himself with the preceding questions. The model curriculum is designed to confront the medical school students with many of these most relevant questions. It will also provide him with part of the basis for beginning to find some of the answers.

APPENDIX

The Economics of Health Services

This course is designed to provide an examination of some of the economic aspects of the production, distribution, and organization of health services. The course outline is intended to provide a basic, but flexible, framework for our discussion and analyses throughout the course. The reading list contains a representative collection of relevant literature. For specific topics the interested student will find a more complete bibliography contained in The Economics of Health by Herbert Klarman. Neither the course outline nor the reading list is intended to reflect relative weights for the several topics.

The basic approach in the course will be to provide an introduction to economic analysis and an application of that analytical framework to health services. All students should be familiar with the material presented in Prices & Markets by Robert Dorfman and this text will serve as the basis for the introduction to economic analysis. It is suggested that each student obtain a copy of this text. (Prentice-Hall, 1967.)

While not required, the following books are recommended in addition to the material given on the reading list.

Caves, R. American Industry: Structure, Conduct, Performance, 1967.
Fein, R. The Doctor Shortage, 1967.
Klarman, H. The Economics of Health, 1965.
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The March 1970 special issue of Inquiry is devoted to Medical Economics and will be a valuable supplement to the general reading list that follows.

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B. Supply, Cost, and Production

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C. Consumer Theory

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D. The Theory of Markets

Dorfman, Chapter 6.

Caves, R. American Industry: Structure, Conduct, Performance.

E. Economic Efficiency

Dorfman, Chapters 7 & 8.

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II. The Scope of the Health Services Sector

A. An Overview

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THE TEACHING OF POLITICAL SCIENCE IN SCHOOLS OF MEDICINE

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Part I

INTRODUCTION

Any attempt to inventory political science's relevance to medical education suggests that knowledge as it is known in political science has come to have more than casual meaning to the challenges, problems and potentialities of medicine. However true in the abstract, any actual transference of knowledge from one discipline to the other must take place within the context of the unique structure of each.

If knowledge transfer is our goal, it probably ought to be admitted that disciplines are by nature self contained, that there is inherent resistance to interpenetration, and hence careful provision must be made for the transference -- if it is on a scale that could disrupt medicine's existing structure.

Knowledge about public-policy making has already come to have a place in one of the fields of medicine, public health. But public administration -- the field with which public health has an interface -- is but one of half a dozen diverse and largely autonomous fields that together constitute political science.* In the same way, public health is but one of a number of organic fields of knowledge comprehended by the class name, medicine.

Why then has the interpenetration of political science and medicine been largely confined to a single field in each discipline? Why is it that the precepts about the ways organizations should be designed and the ways in which they operate have so little interest outside the schools of public health?

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*American government, International Relations, Subnational Government, Politial Theory and Methodology are illustrative of coequal fields.

First, the private practice of medicine is still the most prevalent means of providing care and, as such, has an interface with business management. But more persuasive is the argument that medicine must resist the dilution of its traditional concern with disease and treatment. Otherwise, future patients will be deprived of the care they need, deserve and should have. Put this way, it is difficult to challenge what ought to be the concern of medical education.

The very existence of the STUDY FOR TEACHING BEHAVIORAL SCIENCE IN SCHOOLS OF MEDICINE suggests that there is at least some question, however, about the traditional conception of the physician as an autonomous healer, committed solely to ministering to the ill. Medicine, by concerning itself with preventive medicine, has seemed to disavow this position. To a discipline where the dilemma of how scarce resources should be allocated, the question is raised as to the optimal balance of support for the prevention and the treatment of disease.

Institutionalized medicine, elevated by the American public to a preeminent position in our society as the instrumentality by which the historical threats of disease are reduced, if not irradicated, now faces difficulty, perhaps serious.

First, since America is a society in crisis, medicine, like all other major institutions, has come under a level of social pressure it has not known before.

Second, paradoxical forces such as the 'miracles of modern medicine' are associated with certain crucial problems which overwhelm us, (i.e. longevity vs. the population explosion).

Third, medicine, never a static institution, is approaching a point where mutational change resulting from the accumulation of these developments might well be a necessity.

As a result, political science may have acquired an unexpected relevance to medicine, since its knowledge is pertinent to methods of coping with institutional disorganization and change. More important, a perspective with the kinds of problems associated with these difficulties has evolved from the systematic study of politics.

Points of Relevance

To provide a jumping off place for discussion, there seems to be merit in listing three points at which the knowledge and perspective of political science has pertinence to the underlying problems of institutionalized medicine.

1. Day-to-day Operations of Medical Care Programs: Program frictions, dealing with public jurisdictions, interagency strife are all areas where political science can bring techniques and knowledge to bear. Identifying sources of stress resulting in program friction which curtail treatment capability; presenting alternatives to dealing with arbitrary governmental jurisdictional actions; assistance in untangling seemingly contrary or even contradictory injunctions of agencies linked into a local health program, are some of the ways in which political science has pertinence.

2. Tactical Management of Medical Care Programs: Organizational conflict -- that is, political science can have a good deal to say about the accomodation by means of which disparate aims of the component parts of institutionalized medicine can be pursued. Also, medicine, although traditionally connected with the business or private sector of our economy, now feels the pressure to derive a set of health goals where the interests of all the people are at least considered. And finally, medicine is confronting the problem of determining an optimal balance between what we would like to do in terms of medical care and what we are able to accomplish which shall be labeled the transactional balance. How can this optimalization best be sought?

3. Strategic Considerations in Medical Care: First, at one time, treatment of diseases of the body was the pre-eminent concern of medicine. In time it began to concern itself with diseases of the mind, then environmental health, and now the whole thrust of preventive medicine is upon us. As new health care demands develop, stemming from emergent conceptions of health that are only now crystalizing, how does institutionalized medicine reconceive and reconstruct a program of action (adaptation) instead of merely compromising its existing goals (accomodating)?

Second, is it not possible that in some inchoate way the thrust of institutionalized medicine is no longer attuned to national character (actual or emergent)? That the 'sound and fury' of public concern with medicine reflects not some rationally processed anxiety about its efficacy but a sense that death avoidance is only palliative for our inability to embrace the essential (non-materialistic) challenges of life.

Third, medicine has struggled with some of mankind's historical verities which are in the process of coming unglued. Hundred year life spans may become common place, death can be forestalled, intervention in the process of conception may allow us to determine important characteristics of the newly born. The dynamics through which institutions can meet challenges of this depth can come from the well formed models derived by studying political developments.

While political science has much it can offer to curtail the problems and pressures confronting medicine, yet we must be prepared to contribute something more durable. Our concern is with the physician who will be trained under curricula fashioned and instituted in the late nineteen seventies, whose career will not begin until the nineteen eighties and whose impact on medicine will begin to be felt only at the end of the century.

Since our concern here is to identify an interface between medicine and political science we shall seek a more analytical construct.

Analytic Dimensions of Interface Between Medicine and Political Science

To arrive at some of the basic analytical dimensions which make up the interface between medicine and political science some definition of terms relevant to concepts from both disciplines need to be set down.

The concept medicine-health is so deeply rooted in the thinking of institutionalized medicine that it deserves comment at the start. What we have is a term "medicine" linked with a more generic term "health" that indicates the context in which medicine is the core or focus of helath. The perspectives of political science which accept strain, tension and confrontation as indigenous, introduce a different kind of concept -- one which suggests the presence and impact of these kinds of forces, and is needed if the richness of its formulations are to be brought to bear in relation to institutionalized medicine.

Now we can move to more elaboration in our thinking. One of the most central conceptions of political science makes distinction between the needs of a public and the instrumentality through which activities are mounted to provide for these needs. The elements can then be combined into a single concept -- 'a program and its public.' First, however, there is a hiatus between what is aspired to for any given program, and what are the actualities of those charged to carry on its name; second, clients at some point will object to what agencies have been able to achieve in light of what is expected of them. Medicine is now beginning to utilize a concept that suggests this discrepancy between program actualities and clientele expectations; what follows employs this new concept.

Provider-Constituency: Various terms can be used to denote the programatic and clientele components of institutionalized medicine. Producerconsumer, provider-patient, program-constituency, all have similar denotations. We have opted to combine the term provider, from medicine, with the term constituency, from political science, to produce the polarized concept provider-constituency. This will suggest both the interdependency between patients and medical programs and at the same time the dichotomous relationship between them, implying the impossibility of a fusion of interests and objectives.

Another dimension of the functioning of medicine in our society which we must consider to be equally critical from the perspective of political science is the presumption of the enduring viability of our societal institutions. For it would be not only intolerable, it would violate one of the primary values of medicine were there any reasonable doubt about the availability of quality health care on an uninterrupted basis.

Institutional Maintenance -- Institutional Change: We seldom take the next step in logic, however, and realize there is nothing inherently enduring about our social arrangements. They are subject to erosions of confidence, structural disintegration, procedural malfunction, and a host of other breakdowns, yet we resist the imperative that whatever we have built, we must maintain. Through a combination of 'holding the line' or resisting change in some instances and 'tinkering' in others, change or refusal to change can be made to sustain the viability of an institution and perpetuate its historical mission in our society.

However, real change -- change which breaks the thread of historical continuity and marks the end of one kind of institutionalized medicine and the initiation of another -- is sometimes the only way to survive a crisis in institutional arrangements.

We shall use the terms Institutional Maintenance and Institutional Change to represent these two great concerns. In juxtaposing system change and system maintenance we intend to stress the interdependence between stability, continuity, coherence and durability on the one hand, and change, disruption, displacement, and terminality on the other. A reliable organization is neither unchanging nor always changing; rather there is a balance, one with the other. A viable institution, to invoke one of political science's favorite precepts, is one where program leadership has developed ways of meeting the challenge of change.

What suggests itself now is the proverbial 2 x 2 matrix where these two polarized concepts are plotted against each other to produce the familiar four cells into which plenary concepts can be inserted.

Part 11

RATIONALE FOR SELECTION OF COURSE CONTENT

The problem now is to analyze the subject matter comprehended by the four conceptual spaces defined by the matrix. As we have noted, in the most general terms political science offers medicine a perspective from which to monitor the maintenance and development of the institutionalized structure within which the practice of medicine is housed. Keeping in mind that a casual analytic framework will be of the most use, what are the topics around which the maximum of materials could be most usefully organized?

By returning to the matrix we can derive four broad headings, and these can be used to group sets of topics together. (See Figure 1).

I. Program Leadership

The quality of medical care is directly dependent upon the relevance and reliability of institutional arrangements; that is, extensive and intensive organizational technology. The physician can in no way be considered an autonomous healer. He functions with an interdependent relationship in the community both horizontally and vertically.

	Provider (Interests, concerns, capabilities and objectives)	Constituent (Interests, concerns, demands and objectives)
Institutional Maintenance	I. Program Leadership A. Horizontal Integration of Structure B. Vertical Integration of Structure C. Staffing D. Mix of Organizational Types E. Links Between Medicine and Other Institutions in Our Society	II. Consumer Participation A. Informational Processes B. Issue Articulation C. Policy Alternatives D. Program Monitoring
Institutional Change	III. Program Adaptation A. Conceptualizing the State of the Medical System B. Delineating Problems C. Creating Sets of Policy-Makers D. Development of Social Technology E. Strategies of Change	IV. Forging Policy Alternatives A. Problem-Solving Experiences B. Relevant Staff C. Data Base D. Participant-Consultation Networks E. Intra-medical Liaison

Figure 1.

If medical technology as practiced by the physician in the treatment room of his office is considered to be the primary technology of institutionalized medicine, then there are several ancillary or secondary technologies which, while they may not determine treatment prescription, are just as important to the patient's well being in their support capacity. What counts is the balance between the primary and secondary technologies as complementary but distinct forms of productive behavior.

Coordination and control are terms that begin to bring the matter of balance into operational focus. What we are dealing with here are the concerns of providers (the physicians) with the maintenance of a stable institutional context for the practice of medicine and the organization of care and treatment activities generally. We shall use *Program Leadership* to designate this kind of activity.

There are a number of elements to be considered in this regard:

A. *Horizontal Integration of Structure*: At the local as well as the national level of institutionalized medicine, a multiplicity of organizational mechanisms are relied upon. *First*, physicians are generally organized into one or another form of commercial enterprise (i.e., the solo office, the partnership, the group practice, the clinic, etc.). *Second*, there are formally sanctioned public agencies such as county health departments presiding over various aspects of institutionalized medicine. For example, the service area of environmental health is one. *Third*, there are quasi-public arrangements, such as United Fund agencies (i.e., Heart Association, American Cancer Society, some blood banks).

There could be a good deal of program coherence gained from the imposition of some comprehensive , overhead agency -- such as a Health Maintenance Organization -- on the whole of a community's efforts in medicine. Much would depend on the details of its social technology, that is, the mix of formal bureaucracy and 'volunterism,' and how much 'control of the purse' ought to devolve to an H.M.C.

At the national level an even more challenging set of problems occur, for there is then the matter of competing agencies maintaining alternative ways of organizing institutionalized medicine.

B. *Vertical Integration of Structure*: Beginning with the county health nurse and working up through the layers of local, state and national hierarchy one can easily count more than a dozen levels in the vertical organization of medicine. The economies of scale that would be achieved through the elaboration of these vertical relationships are substantial and inviting. Proposals for the regionalization of medicine reflect attempts to achieve a higher level of coordination among agencies.

Few more ponderous issues face program leadership than when, where and how to strike for increased economies of scale without activating the negative forces associated with decentralization of controls.

C. Staffing: Medicine is now finding that mal-distribution of medical personnel indicates the need for program planning of a kind somewhat alien to its traditions. If physicians are to acquire all the knowledge and skills available to them, they must have more intensive training; yet if the character of the physician is to mutate several times during the course of a normal career, highly specialized and intensive training amounts to building obsolescence into medicine's most expensive resource. Balancing current levels of care with future patterns of care becomes only one of the challenges in the overall staffing of medicine.

D. Mix of Organizational Types: Pluralism means a variety of competing, sometimes even contending, types of enterprises. Medicine is nothing if not pluralistic. Clearly the advantages of half a dozen different ways of sustaining the physician far outweigh the possible disadvantages (a case can be made for public, proprietary and teaching hospitals competing), but at some point, such pluralism comes to amount to an indulgence. Principles that elucidate the balance between purpose and prospect, between stability and flexibility, and between short and long-range economies are the only basis upon which these matters can be decided; and experience has shown it imprudent to attempt to decide them once and for all time. Monitoring and periodic re-examination ought to be the rule.

E. Links Between Medicine and Other Institutions in Our Society: In an attempt to concern itself with the 'whole man,' medicine long ago began to co-opt public education into its attempt to prepare children to provide for their own health needs. Mental health programs concern themselves with churches and church-related facilities in an attempt to penetrate otherwise impermeable sectors of individual experience. The increasing need for ties between previously autonomous institutions in our society will be felt whatever the shape of medicine in the future.

II. Consumer Participation

The focus of our concern under this heading is clear: if medicine is to serve the basic needs of the largest number of people, there must be some effective means of identifying patient needs and focusing these fragments of interests into coherent goals. It is our position, however, that institutionalized medicine does not include communication networks through which these interests could be identified and crystalized into a coherent and widely understood assertion of central purposes.

For example, from the constituent's point of view, when the patient dealt directly with 'his physician,' the doctor could take account of his disease, his state of mind, his family situation, his pocket book and many other aspects of his life that impinged upon his health. The coming of the specialist, third party payments, and group practice all have changed the context of the transaction between physician and patient.

And the fact that the physician found himself in a deficit position in practicing medicine (especially in terms of the quality of his domestic experience, the freedom to pursue avocational interests, and in other areas of life style) was unperceived by his constituents.

What, then, are the penultimate interests of patients? Is death avoidance the single, dominant criterion of well-being? What would other salient program values be? And what of the physician's interests? What good is an office full of expensive hardware and a mind overburdened with knowledge when third parties and a multiplicity of bureaucracies are increasingly more dictatorial of what can and cannot be done for a patient?

Medicine could concern itself with such topics as these:

A. Informational Processes: People want to hear only reassuring things about medicine. As a society, we have come to expect, and demand a level of performance from institutionalized medicine that actively works against our real understanding of it. Hospitals illustrate what we have in mind here; there is much said about 'costs being too high,' but almost nothing is said to suggest that we have come to expect every hospital to provide a full spectrum of services of unimpeachable quality without regard to cost.

What would constitute an accumulative, and adequately funded program of information dissemination as a prerequisite for the layman's assimilation of information so that he could then express preferences from which health goals could be raised?

B. Issue Articulation: Issues are expressions of anxiety about the way a program is operating. In the simplest sense, an issue is that concern which spans the gap between goal expectations and program accomplishments. As this gap grows, issues become more highly charged until they come to represent a demand that 'something be done.' Institutionalized medicine needs to find ways in which both physician and patient can effectively articulate issues before they either fall latent or escalate into full-scale public problems.

C. Policy Alternatives: The evidence indicates that concern surges and subsides in a collective response that typically reflects constituency needs, preferences and demands. They may or may not be realistic as forms of change linking goal expectations to real life accomplishments. Processing issues so that they are transformed into relevant and acceptable alternatives is a challenge to medicine's role in determining health care policies.

D. Program Monitoring: One of the most promising conceptions to emerge in recent years proposes a self-conscious mechanism through which constituents would have the operation of a health care program monitored for them through the services of fully professional, but other than established personnel. While proponents of program monitoring sometimes present it as an alternative to the politics of policy development, it may be that we should think of it as no more than a means of sharpening and supplementing existing processes for forming policy.

III. Program Adaptation

Change is a necessity, even though it is expensive, disruptive and traumatic; change for its own sake, however, is a waste. How then do we distinguish between change that promises an increment in institutional capability from change that portends a dimunition?

The underlying problem is that as the tempo of change picks up throughout society, the pace at which change must be initiated at any one of its institutions mounts. Medicine has come to feel the pressure of these forces as has every other institution in our society.

What we have in mind here with regard to medicine has been labeled program adaptation to emphasize the need for a social technology through which change is instituted rather than the more immediate matter of which changes to undertake.

Some topics under which all this might be discussed would be:

A. Conceptualizing the State of the Medical System: People in organizations have their particular orbits and once settled in they tend to know relatively little about what goes on outside their setting. This is true in local medical care programs. When things do not go as they are expected, most individuals feel they 'know' what is wrong which is seldom the case.

Unfortunately it is almost impossible to do anything constructive about this without a reliable and well elaborated technology for eliciting, aggregating, and processing large amounts of mundane data.

Presentation of findings on the way things have changed is the challenge, once reliable analyses of the state of the system have been prepared.

B. Delineating Problems: The familiar rule of thumb that once a problem has been carefully defined it is half solved only serves to point up a difficulty with which medicine has long contended; symptoms often have little connection with the underlying problems that must be dealt with if they are to be alleviated. Thus, cost controls have no relevance to the high costs of hospitalization. Ultimately the only way to bring hospital costs down substantially is to face the secondary problem of the advisability of maintaining the expensive life-support systems now available in hospitals. Defining problems such as these will require institutionalized medicine to develop conceptual models on the quality of care to be provided.

C. Creating Sets of Policy-Makers: Once a reliable representation of institutionalized medicine's major problems have been prepared, the next step is to get them considered by sets of individuals who have the capacity to deal with these problems. This is not as simple as it sounds. Influentials in the network of policy-makers in institutionalized medicine are seldom in a position to dictate to their constituents what problems they must be prepared to contend with. But creating sets of policy-makers whose concerns comprehend the roots of a problem is something political science has a good deal of experience with even though there are no ready solutions available.

D. Development of Social Technology: Our habit of blaming those responsible for a program with its malfunctions is familiar to us all. But to hold someone responsible for accomplishing a set of formal goals requires that he have the means for meeting these goals. As anyone with program responsibilities in health can attest, nowhere is this more often the case than in institutionalized medicine. The prior question then concerns precisely what kinds of social, medical and other technologies would be required to 'solve' the problem. Unless there is careful research and development effort here it becomes an exercise in scapegoating to levy demands against those in positions of responsibility.

E. Strategies of Change: Institutionalized medicine, like many other sectors of society, has tended to rely upon a strategy of change often labeled incrementalism. Advantageous as incrementalism may be in many situations, in this era of super-specialization, the mechanics of medicine become cluttered, cumbersome and unwieldy as more and more is added to the structure. Innovative change, adaptive change, and accommodative change are only labels for some other basic strategies upon which those charged with the management of change must be prepared to rely.

IV. Forging Policy Alternatives

In the context of change, it does no violence to medicine to say that while Americans have the greatest system of health care in the world, it must be continuously updated to maintain its relevance to the emergent needs of our society. The question that presents itself, then, is what can be done to prepare adequately crystallized conceptions of the future forms a program could take? It shall take a great deal of effort if patients are persuaded to bestir themselves to contemplate what kinds of care they would prefer to those they now have available to them. What would be the most serviceable pattern for constituent mobilization in medicine? Who would take the initiative in developing it? And what of the future of medicine itself? What balance should be struck between death-avoidance and life-embracing strategies? What of the sensitive matter of biasing medicine toward one or another of its multiple constituencies -- children, elderly, minorities?

For us the question remains, what are the dynamics through which the kinds of processes manifested in terms such as creativity, inventiveness and originality go into operation with a constituency? What are the conditions under which imagination becomes active?

A. Problem-Solving Experiences: It appears to be an unstated law that the earlier problems are probed and formulated the more latitude there will be in solving them. However this involves being exposed to larger and more overwhelming levels of uncertainty. So there are advantages in early probing, but also heavy costs; it is the manner in which program leaders resolve this dilemma that determines how their constituents react in considering alternatives as one line of response to strain.

B. Relevant Staff: One of the soundest practices for dealing with problems is to have at least a small staff assigned this responsibility. A planning staff, or some other kind will often serve this need. The critical factor seems to be that there is a decisional point where difficulties can be explored prior to their becoming polarized which precludes imaginative interaction.

C. Data Base: There can be no reliable extrapolation of the future from sterotypes about the present; it is reliable reconstruction of what exists that is the essential condition for undertaking any plumbing of what can be. Careful compilation of the facts from which this can be accomplished is a straight forward, more or less routine, and not particularly expensive process about which we have well founded conceptions.

D. Participation-Consultation Networks: It is a truism, that planning is relatively more costly than the management of day-to-day affairs. To keep a constituency informed requires constant and sustained effort, but the informational function is within the capacity of most medical communities. The initial requisite in this case is the building of consultation networks by means of which consumer participation can be forthcoming. It may be that in the first instance these nets would serve as informational media, with planning and policy-making a function that evolves later.

E. Intra-medical Liaison: Although physicians have a multiplicity of organizations through which they coordinate the several facets of their activities, there may be little or no concerted effort to anticipate the future. More than this, there may be little that is done between or among the agencies within which the monitoring of medicine is carried on.

The pressures of time and the preoccupation with 'keeping things going' form a constraint here. Dramatic as forging the future might be, there is much that is dreary in preparing for choosing between alternative futures. It is resistance to the drudgery that this involves which forms the most effective barrier to this kind of effort.

Planning is the term for what we have in mind here, and political scientists have a unique and valuable contribution to make in this matter.

Part III

INSTRUCTIONAL MECHANICS

It is the premise of this paper that of equal importance with the actual course content is the type of learning experience which can take place through various kinds of social science instructional techniques. The instructional technologies relied upon in higher education in general, and medical education in particular, are largely obsolete; more effective, potent and flexible techniques are now generally available -- though they are not in use. Any curriculum change ought to be utilized as a vehicle for beginning the introduction of as many of these techniques as can be built into new subject matter areas.

Some presuppositions regarding this line of argument will provide a useful point from which to begin:

An elemental change in process within the structure of American society is resulting in the interpenetration of many of our institutions by others. Thus it is our supposition that the medical institution of the future will be involved in cooperation, collaboration and co-optation with such component institutions as education, religion, mass media, and recreation, to name a few.

The accumulations of change in medicine achieves a critical mass such that it changes in some of its essentials every two or three decades. We can no longer assume that an intensive period of training with increments of continuing education will maintain a physician's professional competence over the span of his career.

Institutionalized medicine has previously been organized around the activities of the primary care physician. The drift now is toward some form of professional parity for nurses and medics in addition to professional sanctions for a variety of para-medical personnel. Tomorrow's physician shall have to have interpersonal skills, a basic understanding of both socio-economic and bureaucratic processes, and a multi-faceted role not always anchored in the treatment room or hospital.

Academia no longer stands isolated from society, and Schools of Medicine must be ready to penetrate the 'real world.' The teaching advantages of decentralizing medical instruction far outweigh the traditional practices that have kept students from early and continuous contact with patients, medical practice, and the salient problems of institutionalized medicine.

There are those who are increasingly skeptical about the learning efficiencies of the conventional lecture -- discussion process. Even though we cannot demonstrate that a particular technique is superior to that which we have been relying on, there is good reason to argue that experimentation may be the most effective strategy for breaking the ritualistic bonds of the classroom.

With this in mind, let us now discuss a number of teaching techniques, with which the proposed curriculum can be elaborated.

1. Classroom Instruction: Let us begin this inventory with the affirmation that the classroom should not be discarded entirely. There are situations in which students can prepare a bibliography, probably with the assistance of one or more faculty. They can undertake a series of discussions based upon their reading, with faculty being utilized 1) to provide specialized evaluations, summaries, or orienting talks and 2) to enable the group to periodically take stock of its progress and its prospects.

Case or patient presentation where students provide an analysis of a patient's problems which are then reviewed with the patient and discussed with a faculty member is surely one of the most useful learning techniques ever devised.

2. Programmed Learning: This class heading comprehends a range of techniques and devices running from the learner's manual that accompanies a conventional textbook to computor-assisted learning processes. The essentials of programmed learning are generally familiar to the reader. The student and his teacher-resource person identify a learning unit that the

student is required or wishes to undertake. The program typically includes reading and then some form of active processing of these materials. In the so-called interactive mode the student 'uses' what he has read for some purpose -- to achieve some learning objectives. This may involve solving a problem or it may involve analyzing some problematic situation or evolving a derivative conception on the student's part. When the student sits down at a computer remote and enters into a dialogue with one of the dynamic programs where a secondary learning capability has been built into the computer, 'interaction' takes on profound meanings.

3. *Secondary Data Analysis*: One of the simplest and most profitable learning devices ever discovered involves a student, a counter-sorter, a prepared deck of data cards, and a manaul that takes him through a sequentially structured series of steps by means of which the student creates (or recreates) for himself, concepts programmed into the data deck. The manual typically includes a series of questions accompanied by sheets where the student records his findings after completing each sort of the cards. This procedure can be used for the processing of decks of cards which contain data pertinent to some aspect of health.

4. *Supervised Field Research*: If one takes the position that program leadership in institutionalized medicine cannot calibrate its capabilities to local imperatives unless it understands the community from some more penetrating perspective than that provided by local mores, an introduction to supervised behavioral science research may enable the student to take a first step toward analytic understanding. One of the profound advantages of this process is that the student literally discovers certain salient things about the nature of reality for himself.

Providing a community where access has been cultivated so that there is some degree of mutuality of purposes between local medical leaders and medical school faculty is a necessity. Students, provided with a list of potential research enterprises that are interesting and challenging to medical personnel on the scene, who are given tutorial assistance in the research project, and who can work in teams with other students, preferably from the behavioral sciences and other fields outside of medicine, can probe, for example:

Conceptions of major problems in institutionalized medicine among the local medical community;
Distribution of time within the practices of three or four physicians (introducing the student to the variety of practice styles);
Cash flow within a medical clinic or group practice;
Interaction between local medical community and third party payment agencies;
Career patterns of local medical professionals;
Competing conceptions of health among local medical personnel;
Consumer attitudes toward some aspect of local medical practice.

5. Television Program-making: Provided the equipment to do the job and assigned a sensitive television production staffer, any three medical students can make a meaningful thirty-minute television program in the time it would take them to study one textbook. It is an uncanny coincidence that what is required to make the television program is precisely and exactly what is required to learn about something.

Some imagination is needed to place this activity in a context where it can serve the interests of students other than the participants themselves. For example, it is a simple matter to have a team of students tape a program presenting the people and substance another team of students are researching. It is a short step from here to teams of students working with the chief of staff at a local hospital preparing an analysis of some problem of concern to his associates for which a date has been set aside where the students make a presentation of their findings for the benefit of the staff as well as to receive their critical reactions. From here medical students along with members of the medical community can move to working with citizen's committees in the analysis of local health problems. Study groups can be formed around this kind of enterprise.

The acquisition of a library of tapes raises the possibility then that students shall have access to a series of studies of local medical problems and can begin their own orientation to the community with the aid and support of minimum tutorial assistance.

6. *Case Studies*: The preparation of a concise, narrative description of the emergence, analysis and resolution of a problem has achieved a position of importance in political science. The unique contribution of the narrative case study is that it typically deals not merely with the roots of a problem and its emergence as a full-fledged difficulty, but with alternative ways of dealing with it and so-called action issues. What is critical here is that the narrative case tends to promote the examination of not merely others ways of doing things, but of entirely different arrangements of goals and resources, means and ends, people and programs.

Case studies of the building of a group practice clinic can be compared with case studies of maintaining a solo practice, or likewise, case studies of group health or other prepaid medical care arrangements can be compared with the operation of a conventionally based medical care program in a small city, and each case could provide dramatic learning potentialities, for example.

7. *Gaming and Simulating*: The essence of simulation involves the distillation of a process into its essentials with the result that time is speeded up and we are enabled to see three dimensionally, that is, the relationship between the past, present and future. Simulations are perfect learning vehicles for students who find that they can easily and comfortably adapt to role stipulations and vicariously experience a substantial portion of that which those 'on the firing line' have gone through. Manual simulations and games

of various sorts are so modest in the time demands they make that students can easily be provided with a series of gaming-simulation packages that enable them to experiment with some of the basic constructs of institutional behavior (within the context of medicine) in a matter of hours -- (for example, the dynamics of change in institutionalized medicine in a small city, or engaging in policy level decision-making about the form and functioning of institutionalized medicine in such a city). Because of the economy of gaming-simulation as a learning device, it bears repeating that all of this can be accomplished within the time that might be invested in mastering a single textbook of major proportions.

8. Supervised Problem-solving: It is not a long step from the kinds of learning activities inventoried above to the practicum type of experience where the student takes independent responsibility for the analysis and formulation of a line of action intended to ameliorate some real world problem. This internship (as it is labeled in political science) and the clinical experience (medicine's label) is the logical consumation of many of the learning techniques we have discussed above.

When these techniques are used to embellish the suggested curricula presented in Part IV, learning experiences of a profound and unique quality will follow which could not be accomplished otherwise through the traditional format of medical education as we generally know it today.

Part IV

CURRICULA PROTOTYPES

The essential concerns of political science in relation to institutionalized medicine may be characterized as centering around change in its many forms -- particularly for the interrelationships between change at several levels and the ways in which these interrelationships can be kept in alignment with each other. Several other dimensions pertinent to the organization of the substantive knowledge we have about politics can be rationalized around this focus of concern.

Three levels in medicine's institutional operation can be stipulated as the basis for course development:

I. The Local Health Care System (as the context for the practice of medicine).
II. The Community (as the context of the local health care system and at the same time the domain where contending or even competing 'interests' are balanced).
III. The Regional and National Levels of Health Care Organization (as the setting where major program values are defined and assigned resources).

Obviously, these three levels of concern are nested together in such a way that each provides the context within which those above it take place. Equally important is the converse; that is, each provides the instrumentality through which purposes and needs identified at the next higher level of institutionalization goes into process. What we are talking of here is one of the basic precepts from the policy science -- that broad goals can only be forged through the use of great nationwide political instrumentalities, while services must, perforce, be provided to one individual at a time through a program mechanism firmly seated in a locality. Embodied in this nested conception of medicine is the postulate that one of the critical dynamics in any great program of action is that of balancing expectations -- especially of those who are the local constituency for a program -- with service capability; and achieving this balance within cost limits that are (a) adequate to sustain an effective level of program operation and (b) palatable in terms of competing demands for resources.

The political scientist's concern asserts that politics involves balancing costs with services on each of the levels of institutional organization. To put the matter in other terms, policy-making is a social technology developed as a means of maintaining a moving balance between health needs and program capabilities which comprehends the relationship between the total program costs and the benefits to a multiplicity of constituencies.

It is precisely because any attempt to deal with problems such as these without a grasp of some of the basics of politics are almost bound to lead to disaster that political science has become relevant to medicine. Which brings us to two questions anyone contemplating designing courses in this area must consider:

1. What are the key concepts that the student shall have to grasp to come to grips with the problem-oriented policy-making at each level of institutionalized medicine?

2. What are the most appropriate learning techniques through which to articulate courses dealing with each of these kinds of concerns?

Since the last two sections of this report have dealt with each of these two questions in order, what we come to now is the mating of concepts with instructional techniques within the framework of prototypical courses. Three courses, each matched to one of the three headings listed above, are set down in the remainder of this part of the report.*

I. The Local Health Care System As the Context for the Practice of Medicine

While the training and experience given a physician place a gross kind of limit on what he can and cannot do, the immediate determinates of his practice, its style, thrust and character is the milieu in which he works. What kind of hospital (if any) does he link himself to, what kinds of specialists are active in his area, what kinds of para-medical and other health-related personnel are tied into treatment activities here, and what is the stance of third party payment agencies -- these are the kinds of questions immediately determinative of practice styles.

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*In each of the three course areas that are described below, two or more suggested formats will be offered. The initial format may be thought of as comprehending the 'essential' materials and the second, a 'desirable' way of expanding upon this. In several cases 'specialized' materials going beyond either of these formats are suggested.

It is not to these aspects of medicine per se that political science is pertinent, though. Rather it is the matter of the kinds of changes one might expect that is of concern. The factor that is critical to the management of one's own practice is the forces operating toward the stabilization of the existing structure of a local health care program and the way in which they impinge on the forces operating toward program change.

This course is framed to encompass the Local Health Care System and would be in the range of first year students provided they were given sufficient tutorial assistance by competent behavioral scientists. Concepts discussed earlier which might be mobilized are: 'Staffing' and staffing patterns along with 'Mix of Organizational Types' to offer an initial handle for getting a hold on the situation. With some understanding of these manifest dimensions of the local program the student can increase the depth of his understanding through insights into 'Creating Sets of Policy Makers' and by gaining a grasp on the 'Problems' extant in the program at a given point in time.

A number of instructional strategies are relevant to this problem and these concepts.* A course could be divided into three units.

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*Throughout this section the term 'class' shall be used to signify a course that is scheduled to meet one morning or one afternoon a week for three hours over the period of one quarter -- ten weeks. Class = 30 instruction or contact hours.

Unit I: During the first, readings dealing with the concepts could be keyed to lectures followed by discussions, all of which were designed to introduce the student to the conceptual framework needed to gain an understanding of the essentials of the health care delivery system as a social mechanism.

Unit II: Here, leaders from four areas of the health program in a laboratory community could be brought to the classroom to discuss television programs describing (1) the hospital, (2) mental health facilities, (3) community health planning, and (4) third party payment agencies.

Unit III: During a final three weeks students could divide themselves into teams going to the laboratory community to probe the structure of each of these (or other) areas of the health program, preparing a set of papers that were read by all the members of the class, then discussed with each set of local leaders who visited with the class during the second unit.

For more advanced students, a somewhat more challenging course might be assembled.

A Second Format, Unit I: During an initial three week unit of the course students would:

1. View specially prepared television tapes to introduce them to the character, operation and problems of each of the component areas of the laboratory community's health program. Tapes could be viewed at the student's convenience, but they would be keyed to the three afternoon's of discussion and the student would be expected to have worked with the tape until he had identified all of the questions he would have to ask to gain a reliable grasp of each of the three central components of the local program.

2. Reading materials keyed to the tapes would be provided to give the student a grasp of how each component of the program was expected to operate, the social technologies through which it was organized, and an insight into the problems that were typical of these activities in average communities.

3. Health leaders from the community, including those to whom the student had been introduced during his viewing of the tape, would visit with the class for half of each of three class periods, providing them with explanations going beyond the tapes and the reading materials and answering their questions.

4. The last half of the class period would be devoted to students and their instructor in a review of the assigned component of the program, perhaps through the process of drawing diagrams representing the flow of activities and the distribution of functions among the agencies and individuals linked into this program area.

A Second Format, Units II and III: Students would be expected to go to the laboratory community during the last seven weeks of the class to undertake case studies of problems in at least two of the three program areas covered during the first unit of the course. The first order of business during the second unit would be the selection and definition of case studies and the forming of the teams of students to undertake them.

If, during the first unit of the course, faculty or staff had visited the community inviting individuals from across the community's health program to serve as advisors to the teams, it would be possible to have a faculty member back-stopped by a resource group from the community. They could bring their detailed knowledge of local problems to bear on the case studies during review sessions held with students once they were well into their analyses.

In medical schools where residents in family medicine or some other relevant department were available to assist in this kind of learning exercise it would be possible to escalate the level of the learning task in several ways:

1. Instead of merely doing casual case studies, students might be encouraged to undertake the making of a television tape providing a visual presentation of their analysis -- with the expectation that this would become part of a library of video tapes that would be used by succeeding classes.

2. Instead of undertaking an analysis of some case, the work of students from year to year might be so coordinated that some students would take a case study of a problem completed during the previous year as a problem to which they would seek solutions. Local advisory groups as well as sets of faculty with relevant competencies would be mobilized to assist teaching faculty in following and preparing a critique of the course of each study.

Recommendations would be presented to the relevant operating officials and their responses would become part of the student's feedback for the project.

II. The Community As the Context For the Local Health Service Delivery Program

It is at the level of the community where the criss-cross of tensions both within and between programs are most easily seen. Charges levied against health providers by organized interests suddenly lose much of their pejorative quality when they are put in context alongside of (a) the full spectrum of claims coming to bear upon health leaders and (b) the competitive claims of other programs for limited community resources.

From the political scientist's point of view, dealing with this unstable compounding of interests reduces itself to finding a way of balancing claims with capabilities by factoring out the complimentary purposes from a whole spectrum of claims and providing well conceived program mechanisms for achieving these. The concepts he relies on for doing this are in the matrix discussed earlier; i.e., program leadership, consumer participation, program adaptation, and forging policy alternatives.

That the physician of the future must be equipped to take an effective part in program leadership is one of the thrusts of the work of this committee; the question, then, becomes one of what the student needs to understand in order to equip himself for taking initiatives in program development.

The policy science's answer to this question is that program leadership pivots round the analysis of tensions (both those within and those among community programs). It then identifies what these imply by way of program change. This is pivotal, but not the only function of program leadership, however. Undertaking a change in a program is a costly enterprise. To consumate change, leadership must enlist those who can speak for consumers -- on the one hand -- and those who have the professional abilities to devise the modifications in existing program arrangements -- on the other and then induce these people to undertake the forging of policy alternatives.

Obviously, we cannot hope to do more than introduce the student to the intricacies of program leadership during the span of a single course, hoping that he will pursue postgraduate training in management if he wishes to prepare himself fully here. What kinds of introductory experiences might be most useful? Several suggest themselves:

Unit I: During an introductory unit of 3 weeks, one instructional format could be organized around the development of a case history of two episodes of program leadership in a laboratory community, one which is viewed as successful and another that is seen as leaving something to be desired. Lectures and reading materials might be used to sketch in the context of program leadership. During this period the instructor would identify individuals from the laboratory community willing to act as sponsors for the case history; during the first unit they could discuss what would be involved in one versus another possible study.

Unit II: Students then could assemble themselves into teams at the beginning of the fourth week of the course by opting for a given pair of case histories.

Unit III: At the end of the second unit of the course (in the sixth or seventh week), reports on less than successful studies of program leadership could be circulated as a background for the probings of effective incidents of program leadership.

A Second Format: This course might emphasize the multitude of studies which students of management have produced during the past quarter century. Sets of readings dealing with aspects of each of the four cell headings in the matrix could be assembled; these could be discussed during the first half of the weekly seminar period and a resource person either from the faculty of the behavioral sciences or from the ranks of health leadership could be induced to illustrate how these concepts go into process as effective leadership activity.

A Third Format: The mode for the organization of this course, providing a much more intensive experience, would involve students being 'built into' policy dialogues in a laboratory community. Since there are always more problems than there is time, health leaders are more than willing to work with medical students who are adequately supervised in making a frontal attack on a local problem that is not viewed as controversial. In this case students would be briefed by community leaders during the first unit of the course; they could also be expected to delve into the literature relevant to the problem. During the remainder of the course they would divide up into teams working on various aspects of the problem -- in full consultation with sets of community leaders previously mobilized by the instructor. The last two meetings of the course would be devoted to producing an analysis of the problem and spinning out alternatives in consultation with community leaders.

III. Regional and National Levels of Health Care Organization

Beyond the reaches of community a subtle but invidious complexity intrudes itself into the processes of our understanding health problems; regional and national dimensions of health care can never be experienced by any one person. To put the matter as the policy scientist would phrase it, problem solving -- at the top levels of institutionalized medicine -- must be carried on through reliance upon models, information processing and the rational extrapolation of consequences from indices (rather than from experience with what has happened in the past).

If, that is, we are to maintain a workable balance between our capability to produce and provide health care and our expectations as to what this should consist of, we must learn to use an intricate social technology now emerging through the efforts of the policy sciences. How can we best introduce the medical student to this elaborate body of knowledge with a jargon as inscrutable as that of medicine itself?

As is the case with any body of technical knowledge, acquisition of vocabulary and elemental principles is the first order of business and either programmed learning strategies or the traditional classroom lecture suggest themselves as the most efficient way to present this to the student. Systems is certainly the key word in all of this for it is casting the particulars of institutionalized medicine within the confines of a system's model that marks the point from which the student must begin in developing the capacity to comprehend the larger dimensions of health as a national program of action.

The central question around which policy-making at this level rotates is what kinds of resources can be committed to what kinds of new programs or reorganized programs to achieve what kinds of revised sets of expectations. The simplest way of attacking this matter is to provide the student with a coherent model of health as a dynamic system and to so form this model that indicators of health care effectiveness can be processed through the model to provide indices of health care accomplishments. Once the student has had the opportunity to familiarize himself with the model he can move on to the critical learning task: What kinds of changes have to be made in (1) inputs and (2) program structure to realize (3) specified changes in outputs?

Units I, II and III: If a course is broken into three learning units of three, four and three week's duration respectively, the first unit can be devoted to familiarization with vocabulary and principles, the second to understanding the static (or structural) and the dynamic (functional) models, and the last unit to the processing of different sets of output and input data to discover the changes in program structure that are required if the stipulated shifts in program outcomes are to be realized.

A Second Format: A course that covers a good deal more than these essentials can be elaborated. First, a learning program keyed to a text book can be coordinated with a set of television tapes providing the student with (a) a discursive introduction to policy science, (b) the primary objectives of policy-making, and (c) the most frequently disruptive problems in dealing with national health care. A four week introductory unit could be developed giving the student a solid grounding in the policy sciences approach. A second three week unit could be devised introducing the student to a computor simulation. Were this unit accompanied by lectures and demonstrations where the student came to grips with the static and dynamic elements of the computor program as well as television tapes explaining the technicalities of the operation of the program, the student could reify his abstract understandings from the first unit into concretized conceptions linked to the computor simulation. A third unit based upon classroom discussions of how the dynamics of the nation's health system went into process, keyed to a series of assignments where the student programmed alternative kinds of policy-decisions into the computor, would complete the student's introduction to health as a national program of action.

A Third Format: Were the resources for the development of a still more elaborate learning program available, this computer-based strategy for instruction could be implemented with a man-machine simulation where groups of students playing the roles of each of the central actors in health policy-making could make decisions which were then processed by the computor to indicate 'real world' consequences.

Section G

IMPLICATIONS FOR ACTION

Transformation of Behavioral Science Knowledge Into Health Practice

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Organizational Forms for Medical Behavioral Science Programs

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TRANSFORMATION OF BEHAVIORAL SCIENCE INTO HEALTH PRACTICE

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TRANSFORMATION OF BEHAVIORAL SCIENCE KNOWLEDGE INTO HEALTH PRACTICE

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In defining the content of social and behavioral science teaching in the medical school setting, an important ingredient for consideration is the extent to which this information can be converted by the student or physician into usable or relevant material. There has to be the constant question of "Why does a medical student have to know this?" This question, although seemingly simple and some might even say obvious, is extremely complex and presents many problems. Anyone teaching medical students becomes aware quite soon that he cannot transfer his lectures straight from graduate, academic teaching, without being asked why the medical student must know that material. Faculty are often reminded of the difference between behavioral science and the "real stuff" that counts in becoming a physician. These questions are raised by non-behavioral science faculty as well as by students.

At the same time, behavioral scientists may experience resistance and possibly some feelings of guilt or betrayal to a parent discipline, in presenting what might be considered as a watered down version of material. Yet, presenting detailed data, methodology and theory with all of their implications may not be possible, given time limitations, and may not even be desirable or necessary. The behavioral scientist teaches students who are to become capable physicians, not behavioral scientists and is therefore limited by the constraints of the medical school setting.

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* Written for the study of Teaching Behavioral Sciences in Medical Schools.

Given the great time demands made on the medical student, it becomes imperative to define clearly what should be included. Basic science courses that are well entrenched, such as biochemistry, physiology, etc. are increasingly going to be called on to have a sharper focus of presentation to eliminate what does not seem relevant or necessary. Behavioral science courses that are not so well entrenched cannot afford the luxury of the traditional basic science courses and must therefore, from the beginning, demonstrate relevance and convertibility.

What is meant by behavioral science convertibility is the extent to which these materials can be translated so as to be perceived and accepted by medical students as relevant, useful and needed by the competent physician. There are some behavioral science areas that by their very contents are more convertible. Other areas that are not as apparent, may become convertible by the methods used in presentation so that students become convinced of their relevance. Some behavioral science materials have application to a wide range of activities, while others are more limited. Some are convertible to activities directly related to patient care, while other information aimed at the student himself, might be indirectly convertible.

Convertibility is not a simple dimension and it cannot be defined independently from the target and purpose of the teaching, the activities and needs of the student and physician, and the specific contents of the presentation. It is also affected by the nature of the available data. What may be considered convertible and relevant under one situation would not be under other circumstances. Thus, the detailed research procedures involved in assessing attitudes may be of vital importance in a research seminar whose purpose is to teach future public health physicians how to assess reactions to policy changes. It is probably of little direct relevance to a group of students who are only concerned with the results of the study and how it would affect patient management.

The various dimensions of convertibility will be examined in this paper and examples of possible content will be presented to fit them. These examples should be viewed as suggestions based on the experience of several schools and the opinions of the author. In most cases there are no systematic research data on which to base firm conclusions. The basic consideration for elaboration of these various dimensions of convertibility is the past history of not entirely successful programs and at the same time the burgeoning number of teaching programs in medical schools, many of them seeking to benefit from the experience of others. Although each school must ultimately decide its own teaching content based on its own unique situation and available resources, it is the hope of the writer that the suggestions presented can help in this choice by pointing to some of the alternatives.

1. Target of Convertibility

The goal of social and behavioral science teaching cannot always be viewed as being the specific clinical activity--as one physician described it "laying his hands on the patient." At times it is the manner in which the hands are "laid on" or the setting in which this takes place. There are at least three targets for behavioral science teaching: 1) physician attitudes, 2) physician skills and 3) the medical care system.

A. Physician Attitudes

This refers to the attempt at developing an approach to health care rather than relating to any specific technique or skill. Specific content is almost unimportant and may change from year to year without really changing the direction of the teaching.

There are examples at many schools. Generally, the student has to have "demonstrated that he applies high ethical standards in his professional behavior. Demonstrated positive attitudes towards caring for the sick and maintaining the health of the well." The physician must learn to deal with the person, not the illness.

The student is told that as a professional and the expert in medical care his responsibility will go beyond the single patient to the community as a whole. It is therefore important for him to accept this role and actively be concerned for the medical problems of his community and his nation. Many of the issues to be discussed later under Social Action are also important here.

The approach the student takes to many of the medical-social issues such as drug abuse, alcoholism, abortion, etc. enters into the attitude domain as well. By and large the attitude desired is non-judgmental; that is, the student should prevent his personal and moral judgments from compromising the type of care rendered. This attitude also needs to be applied when treating across class lines. Many students feel uncomfortable dealing with the poor and with members of different cultural groups.

Another basic predisposition concerns many of the social diseases as well as other health problems and is an alternative to the medical model of disease. The latter emphasizes the one-to-one doctor-patient relationship and seeks cures by medication even for day-to-day normal problems of living--attempts to cope with and master the normal anxieties and worries. Content here might involve group processes, the role of patient motivation as a means of understanding and dealing with problems of deviance and coping. Not every disease is the result of a microbe that can be cured by its removal. Very few school children require medication because of brain damage. Most school problem-children can be helped by being motivated through the use of better teaching methods.

The self-understanding of the medical student, why he chose medicine as a career, what takes place during his socialization into the field, the awesome powers he will acquire and the way in which he will view his responsibilities is another content area that aims at revealing underlying attitudes. It is mainly an outgrowth of the sociological study of professions and would be classed as the sociology of medicine.

With current development of team practice concepts and increasing use of all kinds of auxiliaries, including non-professional community aides, the sociology of medicine can be significant for preparing the student for the future practice of medicine. Depending on how it is presented, it could lead to an understanding of how effective utilization of non-physicians could benefit himself. Sensitivity training could be an experiential method for helping the student understand and feel what he was taught.

B. Physician Skills

Many of the skills which the student is to acquire through behavioral science teaching will be mentioned later. These include interviewing skills with an understanding that the patient's definition of health and disease, the manner in which he presents his symptoms and the kind of treatment he is willing to accept are partially determined by the social and cultural groups to which he belongs. The student is usually made aware of how to interpret the expression of emotion and feeling as well as the meaning of the manifest verbal content.

Another skill related to interviewing is observation of behavior. Many schools offer the student the opportunity to observe behavior under different curcumstances, analyze what was observed and relate it to didactic material. Thus, for example, students may be asked to observe and compare the behavior of a group of nursery school children and a group of teenagers and relate their behaviors to their normal developmental stages as described in the literature. In other cases students have been asked to observe and classify the behavior of a patient in terms of his being normal, neurotic or psychotic.

From a teaching point of view it should be readily apparent that skills are acquired best when they are actually used and experienced by the student. Unfortunately the opportunity to use skills, especially during the clinical years of training, does not frequently involve the behavioral scientist.

It is felt by many physicians that having an M.D. degree has endowed them with the ability to undertake many activities that those of other disciplines have spent years acquiring. This is especially true of research skills. It is not necessary to repeat the later discussion of research activity by physicians. Suffice it to say that teaching the knowledge of research technique and skills is an area frequently undertaken by behavioral scientists. It has as one of its goals instilling in the physician a critical ability with which to analyze research reports as in journals and judge the efficacy of newly developed techniques so that medical decisions are not made only on information from detail men, authority figures and anecdotes. It can also help those students who would like to conduct research as well as provide clinical services.

C. Medical Care System

Another target of behavioral science teaching is the medical student as a potential change agent of the medical care system in general. The implicit assumption is that since the student has not developed vested interests in a given system of care, and since he will have the power to deal with the future care problems, it is best to present to him what seem to be the problems of the current system and how it might be changed. Usually included in these discussions are materials concerning the utilization of care, distribution of services and manpower, problems of access, and methods of dealing with them. The effects of different types of finance systems, organizational arrangements, use of automation, auxiliaries, and other solutions such as the various health insurance bills in Congress, also have been used as content.

The expectation is that it is possible to solve problems by helping those who come out of the pipeline to be more sympathetic to varied points of view or by encouraging them to enter community medicine as a field. Too frequently, this approach fails to provide follow-through during the clinical years except for those who do elect community medicine as a field.

II. Convertibility by Method of Presentation

The method of presentation is of central concern for achieving maximum effectiveness. The same information can be more or less effective in achieving its desired outcome depending on how it is presented. Relevance has often not been achieved because behavioral scientists have failed to gain acceptance of their materials. It thus becomes partially a matter of plausibility.

A. Passive Versus Active Participation

The traditional approach has the professor in front of the classroom lecturing during most of the classtime. Medical students are quite used to this system. However, for the most effective presentation of social and behavioral science materials a more active student involvement has been found to be important. Several forms of such teaching are possible.

An approach that is gaining in popularity is the seminar system. This involves the breaking down of the class into small sections so as to allow for a maximum of personal contact, student discussion and student presentations. In some cases the entire course is run on this basis with all students covering basically the same materials in each seminar section. In other cases students are given a choice of several different seminars from which they must choose one or two.

Another variation has students choose a seminar section that is used as an in-depth means of covering a selected portion of the materials presented in plenary sessions. It is extremely effective in developing close ties between students and behavioral science faculty while at the same time allowing for a greater optimization in the use of plenary sessions. As an example, a group of students presented a debate for their class based on the materials covered in their seminar. This session was much more useful in involving the rest of the class in the issue as compared to an ordinary lecture.

Emphasis on seminars should not be taken as a condemnation of all lectures. But their use has been one of the easiest ways of gaining acceptance through more active student involvement in the learning process with the possibility of developing a close student-faculty relationship. The seminar is not, however, necessarily the most efficient way of delivering information to a large group of people. This consideration would be especially important for a school with a large student body and a small number of behavioral science faculty, making class division impractical.

There are, however, other means of producing a more active involvement in the learning process. These would include class demonstrations using students, e.g., autokinetic phenomena; debates, e.g. national health insurance; self-instructional materials, e.g. statistical concepts and laboratories, e.g. emotional role playing.

Field trips can also produce an active involvement in the learning process. However, these trips are viewed as a waste of precious time if they become merely sightseeing trips where students see some buildings. They have to be able to experience what is happening at the place visited. This could be done through some form of participant observation or by starting with some predetermined assignment for collecting specific data. An added caution would be to use trips sparingly since they often do consume more than the usual amount of class time.

Whichever approach is used they are all geared to greater student acceptance of behavioral science concepts by capitalizing on the influence process and making learning more interesting and compelling. Active student involvement has been by far more influential than other methods, at least as measured by students' reports of how they were "turned on."

B. Relating Data to Specific Patients

Wherever possible, translation of behavioral science concepts can be made by use of specific patients as case histories. Relevance is thus made immediately apparent. In one school, behavioral science courses use patients in the following manner. There is a handout of all the information and concepts to be covered in the lecture. Class time is used for a discussion and elaboration of these concepts and for a student-faculty dialogue. This is followed by a live-patient presentation for the purpose of demonstrating the concepts. The last step in the process involves a discussion and integration of the patient presentation with the handout. The contents of the handout are important ingredients for the student to take with him so he does not feel that the patient presentation was a waste of time as medical students are oriented to substantive content.

There are several ways in which patients can be presented. The patient might be brought before the class or the class could observe the patient from behind a one-way glass. Since it is not always possible to have a patient available for specific concepts to be illustrated, it is possible to prepare video tapes of selected patients and use these in class. There are also available good films that illustrate with specific patients the points of a presentation beyond the scope of any particular health center. It is important, however, to preview such films and follow their presentation by class discussion.

C. Case Conferences and Rounds

It is vital to continue behavioral science input into the clinical years. Case conferences and rounds represent an important avenue for behavioral science education in the clinical years. It may take time for non-behavioral science faculty to become adjusted to behavioral science input in such situations, but they have been made welcome once it is seen they have something to contribute.

The behavioral scientist on the other hand, can use these opportunities as a means of self-education so he can make his own teaching more relevant. He must also be prepared to discuss a specific patient from the standpoint of the individual clinician. Generalities may not be sufficient. However, the payoff of seeing earlier teaching applied in a meaningful way can be extremely gratifying to the faculty and student and makes it more likely to be adapted by the student to practice after completing school.

III. Physician Activity

One approach to measuring convertibility of behavioral science knowledge would be based upon the activities to which this knowledge would be applied. As is true of any definition of convertibility, content would have a continuum of relatedness to a set of activities with some areas being more directly related than others. Of course, the degree to which it may be perceived as related depends upon the focus and method of presentation. There are several activity categories that can be delineated: diagnosis, patient management, research, community health and medical care organizations, social action and office management.

A. Diagnosis

This category would include the kind of knowledge and skills needed to elicit diagnostic information. Examples include such content as interviewing and history taking. These have been taught as interdisciplinary subjects where the behavioral scientists attempted to sensitize the student to the different possible modes of communication and to the methods of evaluating them. Related to the history taking is the social epidemiology of disease that can be designed to aid in diagnosis, e.g. to differentiate between the likelihood of pheumonia or T.B. depending on the social background of the patient.

One school emphasized as an objective "identifying behaviors associated with specific diseases and disease systems throughout medicine." A course in Behavioral Medicine was offered in the second year that emphasized the psychosomatic, stress and emotional factors in illness, including such things as the behavioral aspects of G.I. disease, liver disease and behavior, reproduction and behavior, cardiovascular disease and behavior, and the social epidemiology of disease. During the third year the social, cultural and behavioral factors that played a part in the etiology of an illness were emphasized during clinical rounds as related to specific patients.

It might be pointed out that there are very few schools offering such extensive behavioral science contributions for the actual clinical activities of the student. This is partially due to the lack of knowledge of the potential contribution of behavioral science, especially on rounds, the general lack of continuity between basic and clinical sciences, the lack of a sufficient faculty, and often the imprecise nature of social and behavioral science data.

Many schools do offer growth and development course material whose convertibility to actual patient diagnosis depends to a great extent upon the way it is taught. Growth and development has been an area claimed by many psychiatrists as belonging to their domain and consequently it has often been approached from a psychiatric, psyschoanalytically oriented frame of reference. Although this information can be helpful, it is of limited usefulness in patient diagnosis outside of the psychiatric and psychopathological domain. Growth and development, however, could include a greater emphasis on the normal progression from conception to death with emphasis upon the differences between various stages and how they affect such things as the manner in which symptoms are presented, the limitations imposed by the maturation processes, the effects of the normal aging process and so forth. Potentially, such information should be extremely useful to many kinds of physicians, such as the pediatrician, gynecologist and the internist who is concerned with the aged, as well as the psychiatrist.

The doctor-patient relationship (materials in addition to interviewing) is another area covered by many schools. It should be highly convertible both for diagnosis and for patient management especially for the establishment of trust and for the continuation of contact in the medical care system. Unfortunately, most schools limit such course content to the basic science years and have very little continuation into the clinical years where it should be translated into the action that matters most.

One area neglected by many schools involves the potentially useful diagnostic instruments found in psychological testing. Although physicians may not become competent in their administration, they could be made aware of their existence, the information that they yield as well as the meaning of such concepts as standardization, reliability and validity that are so necessary for understanding test limitations and possible interpretations. This latter point was brought out in a recent class discussion of I.Q. testing. The students felt that there were too many instances of test misuse. Faculty members had the opportunity to explain that standardization and test construction procedures allow the examiner to know at least his margin of error. A test is useful when that margin of error is substantially less than the error to be expected when not using a test. These points concerning test interpretation apply equally well to accepted medical diagnostic tests, such as T.B. chest x-ray, diabetes tests, etc. but frequently their margin of error and methods for their evaluation are never conveyed to the student.

B. Patient Management

Many of the content areas mentioned earlier have relevance to patient management, e.g., doctor-patient relationship, growth and development, etc. Social and behavioral sciences can bring to bear all of the cultural, social, and psychological and economic factors that can affect the outcome of treatment. These would include such things as patient expectations in regard to care, the assumption of the sick role, and the effects of the sickness on the family. The effects of stress, anxiety, reactions to pain and placebos are topics that can be extremely useful to the student especially if these are translated into meaningful experiences with actual patients. Much of medicine is directed at this area.

A good deal of interest in patient management relates to patient compliance with physician instructions, i.e., patient motivation. This reflects the fact that therapy often seems to be unsuccessful because the patient disregards the advice of his physician by not taking medication or not taking it as indicated, not refraining from poor health habits, such as smoking, nor establishing sound health behavior, such as exercising. Under such conditions, many treatment failures have resulted. One can include in this treatment of obesity, smoking, alcoholism, drug abuse and many other diseases that are combatted through patient observance of a regimen. Some of these are further complicated by social stigma and legal restrictions, e.g., alcoholism and drug abuse.

Successful treatment involves using the information and skills necessary to persuade the patient to accept the regimen and help him eliminate habits that are incompatible with the desired outcome. Where motivation is the central problem, the use of group pressure and empathy have helped achieve beneficial behavior better than reliance on a one-to-one interaction, e.g., Alcoholics Anonymous, Weight Watchers.

To use these techniques in patient management the health practitioner should have knowledge of the principles of group dynamics and their uses.

Many of these concepts also can be applied to reducing stress and discomfort of treatment. Thus members of a patient's family or other significant individuals can help the physician reduce trauma in a difficult situation, e.g., the presence of the father in natural childbirth, the mother who stays in the hospital with a sick child, the clergyman who is a member of the medical team.

Other people such as these are especially meaningful to the dying patient. He has a tremendous need to tell all the things that are bothering him or specifically what he wants done before his passing so he can depart in peace.

It is interesting to note that first-year medical students have been extremely receptive to this information on the dying patients. Perhaps this is the time to impart this knowledge since they are not yet personally involved and need not feel defensive.

Powerful psychological tools for inducing desired behavior are the techniques of behavior modification that have grown out of the experimental laboratory. Increasingly, they have been applied to patient management to help reduce chronic pain, to eliminate fear and anxieties through desensitization and progressive relaxation, to aid in management of obesity, alcoholism, and smoking behavior and currently--through the use of biofeedback--in cases of tension headache. Hopefully, in the near future such techniques will be used to help in many other areas such as hypertension or fractures. Several schools include these areas as topics for seminars or lectures. However, the great usefulness of these techniques has yet to be actualized through experimental evaluation in specific clinical situations and widespread application.

A frequently overlooked area of patient management is the economic impact of treatment. The best treatment plan may have to be scrapped if there are no funds available to pay for it. A physician should be aware of the sources of funds and the effects of various alternative plans on the treatment process and on the family of the patient. If following a regimen means that the patient might lose several days pay this would reduce the likelihood of successful compliance.

At times the economic problem becomes expressed in terms of relative values where the patient as a consumer might choose between medical treatment or a color T.V. The task of a physician is to understand these relative value differences and deal with them in such a manner as to promote the patient's health. The physician cannot assume that since health is his number one priority the same is true of his patient.

Teaching in the area of patient management has been handicapped by the same problem as with teaching patient diagnosis--most schools concentrate on these topics during the basic medical science years and nearly neglect them in the clinical years. When there is input in the latter, it may be limited to occasional clinical case conferences.

C. Research

Notably, many medical students are less than enthusiastic about the details of research methodology. Despite this there are groups of students who are interested in conducting their own research or at least in being knowledgeable concerning the methods of gathering data.

Some schools offer seminars or courses such as "Quantification and Qualification in Medicine." These deal with research methodology as it applies to the medical literature and offer an introduction to computers and their use. Such courses are designed to give the student an appreciation of some statistical principles, their interpretation, and to some extent, an understanding of data gathering methods.

In some schools, medical students are required to carry out a project that requires at least some knowledge of research requirements. It is important to realize, however, that many of these are not exclusively or characteristically associated with behavioral science either in method or content. A good deal depends on whether behavioral science faculty are involved, either by virtue of student choice or at times because there is no one else to teach this subject matter.

From a content point of view, research seminars could be limited to methodology as applied to medicine or could include a specific emphasis--such as methods for health services research. One school offers medical students a program leading to a master's degree in one of the behavioral sciences in addition to the M.D. degree.

Content of research seminars, however, need not be limited to methodology. They could include any area of behavioral science in which a student is interested. Courses similar to these in the traditional basic science may be attractive to students with research interests in that domain. They could cover the so-called bio-behavioral area, including such topics as CNS function and behavior, the autonomic nervous system and emotion, biofeedback and autonomic conditioning, behavioral physiology and pharmacology, etc.

Students oriented toward community and preventive medicine may be more interested in courses dealing with health services organizations, determination of community health needs, evaluation of care, and epidemiological methods.

In general except for some biostatistics, most research related teaching is done on an elective basis with small groups of students. Such teaching usually is extremely gratifying both to students and instructors because of strong motivation ordinarily present when dealing with an area of personal interest. However, exposing all medical students to research methodology as a program objective has not met with very much success. Perhaps this could be accomplished with better teaching techniques such as programmed instruction and self-learning approaches. Use of clinical material as a starting point is another possibility. In addition to specific course content, it is necessary to encourage an overall intellectual environment on campus that motivates students to evaluate the evidence, bibliographical citation, and possible sources of conflict due to methodological errors.

D. Community Health and Medical Care Organization

Many schools offer courses, seminars, or series of lectures dealing with the health and medical care system. They are intended to help the student understand conceptually and practically what the present health care system is like and how it might change in the future. Such courses often include content dealing with the economics of health care delivery, health manpower, quality of care, the utilization and distribution of health care and possibly some comparisons of the U. S.

care system with those of other countries.

Successful use of such course material depends greatly on making it meaningful to students in terms of their day-to-day activities. Except for the student who is particularly interested in public health and community medicine as a career, all too often this material is viewed as irrelevant to actual patient care. Most medical schools do not provide students the opportunity to practice medicine using alternative systems of care described in such courses. Clinical training is based upon the one-to-one doctor-patient relationship. Rarely does the student deliver care as part of a health team giving him experience with other health professionals. Most do not know what it might mean to practice in a neighborhood health center, a private office, group practice, or health department. The student is socialized into his profession with expectations of keeping to the mode of practice his preceptors learned 20 years ago. In essence, the student is given a conflicting message. His courses in medical care organization tell him of the importance of new forms of delivery. Yet, in clinical training by the provision of only the traditional model of care, his clinical preceptors are apparently telling him that the other models are not that important for the practice of quality care.

Community health course material usually deals with more than the single patient unit. It may involve community-wide problems or national issues that do not seem to have an obvious bearing on day-to-day patient care. One school lists as an objective in this area: "To appreciate the involvement of the health professional in the national process of health care delivery." Such an objective may be considered by the student to be"interesting" but of little relevance to him--"That isn't real medicine." Thus, it behooves behavioral and social scientists to translate this material in such a manner as to make it meaningful. Such translation can be helped through active student involvement in course content, through strategic placement of this material in the curriculum so a foundation for it has been laid, and through actual clinical experience in providing care under differing systems of health care delivery.

Teaching of health care delivery systems and organizations may include some of the basic concepts of organizational theory. These concepts must also be given relevance and not left at the level of sociological theory. A valuable approach would be to examine those settings in which the student is most directly involved as a starting point, such as his own hospital and outpatient clinic. Principles of organizational theory and their implications for direct patient care might be extracted from the immediate setting. At that point speculation about alternatives becomes meaningful. In one school where the instructor attempted to present such material at the level of sociological theory, it was received as "obvious", a "waste of time" and as "why do we have to know this."

Where possible it is desirable to have some real life experiences. A field trip might help this area come alive. Some successful examples have been: a 48 hour stay in an inner city area, interviews with patients in their home environments concerning the barriers they faced in obtaining care, examination of how people in a rural setting obtain care, interviewing patients concerning the ways they finance care, and interviewing program directors and patients with regard to the effects of specific programs such as family planning.

E. Social Action

Frequently social and behavioral scientists have been looked to for development of a sense of social consciousness in medical students. Their critics, especially those who fear change of the status quo, use this to argue that social and behavioral science really has no substance to contribute to medical education, only rhetoric. Social and behavioral scientists have been cast in such roles partly as a result of the type of research in which they engaged, e.g., class structure, and partly because such concepts as cultural relativity tolerate a variety of approaches for doing things and are antithetical to prejudice, discrimination, and a double standard of medical care. Courses have included study of the welfare system and its problems, consumer involvement, methods of change in the ghetto and poverty, ethnicity and health. One seminar attempted to involve students beyond a single course by encouraging them to take on an action project which might continue over the whole four-year medical school experience.

With social action, terms such as relevance do not refer so much to actual patient care as to social responsibity by the medical care establishment to unmet, but perceived needs. Medical students have served as advocates to poverty groups helping them find their way through the medical care maze. In some cases medical students have begun providing care in geographical areas where it did not exist, ocasionally forcing the University to take over responsibility for care in a region.

Not all students or behavioral science faculty express equal interest in social action. In cases where such materials are presented to the whole student body some degree of background preparation seems in order. Otherwise critical examination of the present medical care system may produce resentment and defensiveness with the potential of producing the opposite of intended results. As mentioned in a previous section, teaching methods that are experiential in nature probably will have a greater impact on the student with a greater potential for application in actual clinical practice.

F. Office Management

Partly as a result of industrial psychology and its relationship to management problems, social and behavioral scientists have been viewed by some as potential sources of information on practice management. At one school this is offered in a seminar called"Management Concepts for Future Physicians." Many social and behavioral scientists resent this and wish to dissociate themselves from such course content. However, potentially this is an area where the future physician could be reached--his pocketbook. It should be possible to include such concepts as the greater use of auxiliaries and teams in the delivery of care, methods of choosing practice location, especially in geographical regions with scarcity of care, sources of financing of care, and health insurance.

One extremely promising topic under office management is the medical record. This document can be used for the most readily convertible application of social and behavioral knowledge, especially if it is maintained with a problem-oriented point of view. Social and behavioral scientists must, however, be prepared to spell out in great detail how such information might be used in the delivery of patient care. This has not been done to date in most schools.

In at least one place, behavioral science preceptors make it a practice to examine the clinical records of medical students to see if social and behavioral science information is included. It is through such efforts that, from the very beginning of training, social and behavioral science considerations become an integral part of medical care and are likely to be applied in day-to-day practice after the student graduates.

Another area related to office management that is beginning to receive more attention lately is sensitivity training for medical students. This is designed to instill a greater understanding of inter-group relationships--to enhance awareness of the impression the student makes on others and how he relates to others. This might be especially helpful in analyzing how the physician relates to his office staff, nurses and other auxiliaries. Satisfaction in interpersonal relations can help cut staff turnover with all the savings that this brings.

IV. Nature of the Data

One of the most important issues facing the behavioral scientist who is interested in converting his knowledge to clinical application is the nature of his data versus the clinical needs of patients. Psychologists long ago debated this issue in terms of the difference between group data useful for general theoretical formulation, what Allport called nomothetic, as opposed to the type of data needed for clinical prediction, called idiographic theory.*

There is thus a difference in the degree of reliability required for a clinical instrument, such as an I.Q. test, when applied to a specific patient as opposed to the use of the instrument for research purposes where comparisons are to be made between groups of subjects receiving different treatments. In the former situation, reliabilities in the .90 range are desirable while for research purposes an investigator can tolerate reliabilities in the .60 range and still find statistical differences between groups.

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*Allport, G. W. The psychologist's frame of reference. Psychological Bulletin, 1940, 37; 1-28.

Much of the data referred to in teaching by behavioral scientists has been gathered for research purposes and with significance obtained by comparison between groups as a function of different treatments or as a function of different groupings such as social class.

Preventive Health Behavior

		No	Yes	
Social Class	Middle Class	20%	80%	100%
	Lower Class	60%	40%	100%
		100%	100%	

FIGURE A - Preventive health behavior as a function of Social Class (P = .001)

In Figure A is a fictitious example of the type of data a social scientist might have available that is statistically significant at .001 level of confidence. It might be concluded that there is a significantly greater amount of preventive health behavior among the middle class as opposed to the lower class.

How can this be used by the practitioner who is treating nine year old Jimmy Smith? Can he merely assume that since Jimmy is from a lower class group, he is not interested in preventive health behavior? This would be an unfair assumption based on the data in figure A, for 40%

of the lower class sample did follow preventive health practices. Furthermore, it is not clear from these data what specific practices are involved, nor if these data were collected for adults as well as children or only for adults. It is also not clear which social or cultural groupings are referred to in the findings. Does lower class mean Whites, Blacks as well as Puerto Ricans or only one of these groups? Do these data refer to practices prior to coming for care or do they include compliance with physician instructions as well?

There are many more questions that can be asked of these data. The physician dealing with a specific patient for a specific disease wants a definite answer. He will not be content with all the "ifs" and "buts". Unfortunately, much of the data available is of the type described in figure A. The student must be taught how to utilize these data for the appropriate conclusions he could derive from them. For example, they might suggest he should feel an obligation to find out about the specific preventive practices of the patient he is treating. If the patient is from the lower class, there may be a need to exert greater than normal effort at motivating him to accept a specific set of actions. The physician may thus have to use a different approach with a lower class patient than with a middle class patient.

The extent of generalization and the limitations of behavioral science findings are not usually conveyed to the student. Neither is their possible action translation made when applied to specific patients. Many behavioral scientists feel a reluctance to do so based upon the data limitations above. At the same time many students are reluctant to accept the data as relevant until they do.

Freidson* has described the physician's reaction as, what he calls, the development of the clinical mind. Whereas scientists use both specific phenomena to arrive at general principles of knowledge and general principles to apply to specific situations, physicians use mainly general principles applied to specific situations. Physicians are interested in dealing with individuals, not groups. Therefore, they place a greater reliance on first-hand, clinical experience than on general rules. Arguments based upon experience carry greater weight than scientific data.

The clinical mind is described as containing the following elements:

1. There is an emphasis on action; not knowledge.
2. What the physician does makes a difference. It is better than no action at all.
3. The physician is a pragmatist; relies on results not theory.
4. The physician trusts first-hand experience more than abstract principles.
5. There is an emphasis on uncertainty rather than on lawfulness.

The physician thus is taught that what counts is the personal clinical experience he or his colleagues have, even if these data are biased. The physician is described by Freidson as not placing a great value on creativity, originality, or intellectual stimulation. He, therefore, is interested in straight, direct answers and does not care much about theory. Behavioral scientists who wish to gain acceptance of their findings in the clinical setting must be prepared, therefore, to specify the possible conclusions that can be reached for such purposes. It is not sufficient to leave the data for the physician to convert for he probably will not bother.

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*Freidson, E. Profession of Medicine, New York: Dodd, Mead and Co. 1970; Chapter 8.

V. Convertibility by Content of Materials

The extent to which behavioral science concepts are convertible to one purpose or another is of course limited by the specific information taught. Some topic areas seem to span a wider range of application than others. Several examples will be briefly discussed:

A. Example of Broad Versus Narrow Application:

Behavioral Modification Versus Psychoanalytic Theory. The contents of psychoanalytic theory are well entrenched in medical school teaching. One can hardly fail to hear of the battle of the id, ego and superego or of the oral, anal and Oepidal stages of development. They are basic concepts in most psychiatric teaching. Yet, in terms of the day-to-day activities of the health practitioner they may have few meaningful applications.

Psychoanalytic thinking grew out of the treatment of psychopathology. In the case of Freudian classical theory, specifically, it grew out of the treatment of the hysterical patient of Vienna. It is naturally preoccupied with the abnormal and psychopathological. It also lacks strong experimental validation because of the nature of its concepts.

Psychoanalytic concepts are useful for certain purposes, such as their application to psychopathology, their apparant relevance to the development of children, or to the regression of the patient with chronic severe pain. However, just as every patient does not require a histological study, so every patient need not require psychoanalytic examination.

The concepts of behavior modification have been developed, mainly but far from exclusively, in the psychological laboratory. They have a broad degree of application to both the normal and the abnormal individual. They are especially useful in achieving actual change in a patient's behavior and are less offensive to patients than the psychoanalytic methods, e.g. much less emphasis on sex.

Behavior modification concepts are applicable to the reduction of the fears, stress and discomfort of many medical procedures, e.g., the concepts of relaxation and desensitization. Patient motivation and compliance with medical regimen are areas of particular concern and are suited to the application of reinforcement by physicians. It should be pointed out that since behavior modification procedures are aimed at changing or instilling habits, they do not rely solely on the physician but can incorporate the parent, the patient himself and significant others who can affect behavior. This significantly extends the capability of the physician.

The types of problems to which these precedures are applicable include many of the normal problems of living such as difficulty in concentrating on homework, the elimination of such harmful habits as smoking, the more difficult problems of obesity and alcoholism, and management of chronic pain. With the current work on biofeedback, many more problems might also be treatable, e.g., migraine and tension headache, and potentially, even addiction to hard drugs.

It is interesting to note that many medical students reject the approach of behavior modification. This is partially due to questions concerning its validity. However, most important objections seem to be on moral and ethical grounds. It is seen as mechanical, heartless and manipulative of patients. It definitely does not have the "sex appeal" of psychoanalysis. It might be pointed out that many medical procedures are just as manipulative and mechanical. A shot of morphine can be just as controlling as the dispensation of reinforcement. A proctoscopic examination can be just as uncomfortable as aversive therapy applied to the alcoholic. Psychoanalytic control of behavior can also exist even though it might be more subtle and haphazard. Because it is more effective and powerful, behavior modification is not necessarily less ethical than other procedures. As with other techniques, ethical judgment depends on how it is used by the practitioner.

B. Relevance to Basic Science Versus Clinical Practice: Example of Pain

Obviously some topics more readily appeal to the basic scientist side of medical students while others are more attractive to the clinician. The problem of pain reactions and their control is one that is unique in that it seems to span the whole basic science-clinical application continuum. It is also an area of convergence for faculty from physiology, pharmacology, psychology, sociology, anthropology, anesthesiology and other clinical faculty.

From the basic science side contents can be included outlining the basic mechanisms of pain and its physiology, pain as a sensation, its dimensions and methods of measurement and the distinctions between pain threshold and pain tolerance reactions. Understanding of them requires the introduction of behavioral science variables. The well entrenched, hard-headed scientists as well as the clinicians must admit this. It therefore comes as an important area of entry for the behavioral scientist. Additional materials that lend themselves for discussion include the concepts of stress and anxiety and their role in pain reactions, the effects of cognitive sets, personality variables, and socio-cultural groupings.

From the clinical management side enter all the techniques involved in the reduction of stress and anxiety, including the use of desensitization procedures, placebo phenomena, the effects of realistic fears, the sociocultural effects on symptom presentation and reactions to pain, the use of hypnosis and relaxation techniques and the psychiatric use of pain.

Pain as an area of instruction has not been dealt with appropriately in most schools of medicine. Yet, it should be of vital concern to all those who aspire to be members of a profession to alleviate human suffering. It certainly is a meeting ground for behavioral and non-behavioral scientists that is readily convertible to clinical application as well as basic research. It can serve as a wedge for demonstrating the relevance of many other behavioral science concepts.

C. Relevance to Patient Care or Medical Care Organization:

Example of Patient Accessibility and Preventive Care. There are some areas that relate so closely that it becomes natural not to separate one from another. Preventive practices in medicine have become greatly emphasized in recent years as a proper manner in which to practice the delivery of care. Preventive medicine requires some regular contact with the practitioner either for such things as inoculation, check-ups or other forms of preventive maintenance. One must therefore begin to deal with the problem of accessibility of care to the patient which inevitably involves a discussion of the medical care system. Is this teaching patient care or medical care organization?

Actually, it is one example of how it is possible to do both. The knowledge of medical care organization becomes convertible to patient care via the discussion of preventive practices. As has already been mentioned at several points, there are some materials that can be used as gate openers. Once opened, many other guests become welcome. Behavioral scientists should demonstrate relevance of materials first. Only then will the rest seem to follow along smoothly. There has to be careful search for such pivotal areas.

VI. Concluding Remarks

In teaching behavioral science to medical students, it is important to realize that they are not interested in becoming behavioral scientists. Careful selection of materials is thus an important requirement. Content areas to be taught should be convertible to physician utilization at one level or another and this convertibility and relevance should be demonstrated to the extent possible.

There are many ways of defining convertibility, depending greatly on the objectives to be reached and the kind of activity into which the knowledge will be converted. What is required under one circumstance may not be relevant under other conditions. Relevance is also greatly affected by the sequence, timing and methods with which the materials are taught. In addition, certain materials seem to be pivotal areas for opening doors for other behavioral science input. Behavioral scientists might do well by utilizing these areas whenever possible.

ORGANIZATIONAL FORMS FOR MEDICAL BEHAVIORAL SCIENCE PROGRAMS

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In order to raise the question of the most proper organizational form for the establishment of a teaching program in the medical behavioral sciences, one must have made the following assumptions: that the study and understanding of human behavior is essential to the understanding of the total patient and disease process; that behavior is a biological as well as psychological and sociological phenomenon; and that the study of basic human behavior is a major component of the basic sciences, relating to all fields of clinical medicine.

With the affirmative acceptance of these assumptions, the question is inevitably asked, "Should I have a separate department of behavioral science?" How one organizes a behavioral science teaching unit depends on many other basic questions, like, "What specific educational objectives do I wish to accomplish with such a behavioral science unit?", "What are my available behavioral science resources?", "What are the dynamics of my own local faculty which would support or destroy such an effort?", and, "What are my own commitments, as a dean or faculty member, to the behavioral sciences in terms of budget, space, positions, curriculum time, faculty and academic equality, and what changes in patient care that might be expected to result from such a program?"

Assuming that one has answered the question of why have a behavioral science teaching program and what educational objectives should it be designed to accomplish, we can then turn our attention to the most optimal administrative arrangement for a behavioral science program.

There are a number of possible administrative units which can be postulated, but a review of existing medical schools reveals at least six different types of administrative arrangements for the teaching of behavioral science. They are as follows:

1. Department of Behavioral Science — an autonomous department in a medical school with its own chairman, budget, space, and allotment of curriculum time; most often considered as a basic science department; relating to all areas of medicine; teaching and consulting in all phases of medical education.
2. Division or Section of a Department — a section or division of behavioral science within an established medical school department; usually within a department of psychiatry, but occasionally in another clinical department such as community medicine, preventive medicine, or family medicine.
3. Curriculum or Subject Committee — an interdepartmental curriculum or subject committee operating independently of any specific departmental base; teaching faculty drawn from several different basic science and clinical departments.
4. Departments of Anthropology, Psychology, or Sociology — the utilization of teaching faculty from disciplinary departments in the parent university; occasional joint appointments in a clinical or basic science department of the medical school; a decentralized structure.
5. Renamed Traditional Department -- a traditional clinical or basic science department may change its name and mission to include a major behavioral science component; often similar to a division arrangement, except that the term behavioral science will usually appear in the name of the department, e.g. Psychiatry and Behavioral Science.
6. An Institute or Center — usually a research unit established in close association with a medical school, teaching hospital, or a related university facility; research and consultation faculty are often available for teaching medical students on a formal or informal basis.

CRITICAL QUESTIONS AND DIMENSIONS

Before considering the assets and liabilities of each type of administrative structure, it is important to review some of the more critical questions, or dimensions, which must be considered if one is to assess the optimal administrative arrangement for a medical behavioral science teaching program. These questions fall into three general categories: the extent to which the arrangement will implement and develop the basic goals and philosophy of the medical school; the total ecology of the medical school, especially the academic, student, and administrative ecology; and the developmental needs of the behavioral sciences and the behavioral scientists. Within these questions, there are also many separate considerations with which one must deal, if a viable behavioral science teaching program is to develop.

The question of the best administrative arrangement to implement and develop the basic philosophy and goals of the medical school may seem so obvious that it barely needs mentioning. On the other hand, many schools have formed blue ribbon committees to articulate their basic philosophy and objectives but have not taken the necessary step of assessing each learning experience in terms of its contribution to the stated goals and objectives. If human behavior is considered to be basic to all fields of medicine, then it will require a different administrative structure than if it is regarded as only basic to psychiatry, or family medicine, or community medicine. If the goal is to train a primary physician then the arrangement and integration might be quite different than for the training of secondary or tertiary specialists. If a school is more concerned with integrative learning, or problem solving, or the total patient, the behavioral sciences will have different administrative requirements than if one is primarily concerned with disciplinary specialization or the encyclopaedic approach to knowledge and the patient.

A careful consideration of the total ecology of the academic, administrative, and student situation is probably the most important factor to predict the survival and success of a behavioral science teaching program. It is here that one must deal with the real practical politics of academia. How can a discipline gain academic credibility? What are the major criteria used by a faculty in accepting each other as true colleagues? If research has more priority and rewards than teaching, then it is not realistic to establish a behavioral science unit excited about it's teaching and the possibilities for innovation, when the "system" does not promote and reward that activity above all others.

In administrative ecology, the most important questions deal with the making of decisions about budget, space, salaries, policy, recruiting, committees, curriculum time, etc.. If these are made by department chairmen, then to have the behavioral sciences without a behavioral scientist chairman would be relegating the behavioral sciences to a peripheral mission with a noble charge, but without the authority or resources to back it up.

The question of student role in the ecology of a medical school is becoming increasingly important. With the advent of "relevance" and activism, the students are helping the faculty interpret the existing learning experiences in terms of meaningfulness to their educational goals. On the other hand, the survival system in most schools is still a forceful reality. Much has been done to diffuse the parochial power of separate departments, to allow students to have some patient contact early in their training, and to recognize the strong motivation for humanitarian concern. However, the medical student must deal with the discrepancies between the fantasies and aspirations of what the faculty wants to provide and the reality of the day-to-day learning situations encountered by the student. He often gets a double message from these experiences which may tell him such things as: people are important as long as they don't get in your way; becoming a primary physician is important as long as you master my specialty first; problem solving, not the accumulation of facts, will be the most important task for you to accomplish, so let's get on with the job of learning as many facts as you can about my discipline. The bewildered student is often confronted with the paradox that he would like to learn more about social factors and human behavior, since it is such a large part of doctoring, however, the survival system tells him it is less important. Besides, he often feels that he is working as hard as he can, attempting to master the traditional disciplines, without having to accommodate a new discipline as an overload.

The point is that all aspects of the student's learning environment are important, including each classroom and patient care experience, promotion criteria, student admissions process, examination policy, and faculty behavior at all levels. Just as being sick is a total organism response, so, learning to be a physician is done in the context of the entire educational ecology, whether it is a new school or an older school with long standing traditions.

A third question to consider in deciding on the most appropriate behavioral science administrative structure is what are the developmental needs of the medical behavioral sciences as an evolving discipline, or disciplines, and what are the developmental needs of behavioral scientists as teaching faculty? As medicine and medical education is beginning to respond to its own academic and patient care imbalance, the behavioral sciences are responding by attempting to redefine their own multidisciplinary roles, content, points of educational and patient care intervention, colleague relationships, disciplinary identity, and administrative needs.

There are at least three major needs or tasks in the behavioral sciences which must be effectively met through the resources of an administrative unit. These are:

1. To synthesize a body of knowledge on basic human behavior and to integrate the behavioral disciplines into medicine. This is a most difficult task since there is no readily available text or body of knowledge, as exists in the other basic science disciplines.

2. To teach the basic principles of human behavior as they are related to medical problem solving. While teaching should have the highest priority at a medical school, the assumption is often made that if one is thoroughly trained in a discipline, then he should have no difficulty communicating this discipline. We know that it does not work out that way in the other basic sciences, and there is less reason to expect that it would be as easy in the behavioral sciences, since it involves the identification, synthesis, and teaching of content in a form that has not existed in the past. The other basic sciences have already evolved through this phase of development with existing textbooks and teaching programs.

3. To conduct research in the various behavioral sciences with considerable emphasis on bridging between disciplines. Since some of the most exciting breakthroughs in science have occurred at the interface between disciplines, and the behavioral sciences actually represent multiple disciplines, it is important for the behavioral sciences to have an opportunity to work together in their behavioral research in very much the same evolutionary pattern as was followed by such disciplines as physiology, biochemistry, and pharmacology in the past.[1]

The behavioral sciences have had a rather short, but rapid, development in the history of medical education. In most instances, they began within the context of psychiatry, occasionally within a department of medicine or pediatrics, and usually centered around the teaching of doctor-patient relationship or the teaching of interviewing.

In an effort to develop as broad a base of scientific support as medicine, surgery, and pediatrics have enjoyed, psychiatrists began to look toward their colleagues in the social science departments of the university to assist with the new emphasis on basic research in clinical departments. Most often the colleague was a clinical psychologist who had been building a considerable fund of knowledge and skill in the measurement of human attributes, as well as participating in the process of psychotherapy.

The social scientist had a good deal to contribute to psychiatry through his already established research on human behavior, especially with his knowledge of research design, measurement, and statistics. For the social scientist this was a fortuitous development because he desperately needed the real life and real patient situations with which to continue his study of behavior.

As clinicians of other medical disciplines also began to collaborate with the social scientists, they began to see that the social scientist had specific research skills and a body of basic information about human behavior that added a new dimension to the understanding of normal biological function and dysfunction. However, it was psychiatry which had the greatest need for a supportive basic science of human behavior, that accepted most eagerly the participation and transplantation of the social scientist into the medical school.

Often, however, the psychiatrist was unable to establish the kind of colleague relationship that the social scientist had learned to enjoy in the evolution of his discipline on the university campus. As a result, many social scientists began to feel used rather than appreciated as colleagues. This had caused a number of identity and recruiting problems among social scientists. Although destructive in this manner at times, the development of the behavioral sciences within departments of psychiatry was an important evolutionary step in the formation of a teaching and research discipline of behavioral science. Without the support, encouragement, and nurture that behavioral scientists received, it is unlikely that the discipline of behavioral science would have progressed to a level where it could now function as an independent unit or as a separate discipline.

While the intent of this paper is to consider the most optimal administrative structure and professional relationships, this can obviously be done only in the context of an evolving discipline, the trends in medical education and practice, and the professional and human characteristics of the faculty involved. We must be allowed the freedom to learn from our experiences and not be required to repeat necessarily the same evolutionary process or perpetuate the same academic errors which may have occurred in other disciplines.

ASSETS AND LIABILITIES OF ADMINISTRATIVE UNITS

Let us now consider some of the assets and liabilities of each administrative unit, in terms of the primary mission of teaching the behavioral sciences in a medical school.

1. A Department of Behavioral Science.

If one accepts the assumptions that human behavior is essential in understanding the total patient and the disease process; that it involves more than either biological, psychological, or sociological components; and that it is truly a basic science related to all fields of medicine; then, it follows that it should be established as a truly basic science department comparable to such other departments, such as anatomy, biochemistry, microbiology, pharmacology, and physiology.

In most instances, a separate department would possess the characteristics necessary to provide a positive answer to the three major questions of basic philosophy, academic ecology, and developmental needs for the behavioral sciences. As a fully autonomous department of the medical school with its own chairman, faculty, budget, space, curriculum time, and with full access to the teaching and research resources of the university, it should be able to compete with optimal efficiency and effectiveness in the politics, responsibilities, and rewards of the academic medical subculture.

A number of medical schools have established departments of behavioral science or human behavior. The first of these was established by Robert Straus at the University of Kentucky fifteen years ago.[2] This represented a firm recognition of behavioral science as a teaching and research discipline in a medical school. Since that time, Departments of Behavioral Science have been established at Pennsylvania State University, Temple University, the University of Toronto, and the University of Sherbrooke, a Department of Medical Psychology at the

University of Oregon, a Department of Human Behavior at the University of Southern California, and a Department of Behavioral Biology at the University of California at Davis. Several other medical schools are currently studying the feasibility of establishing similar departments. Also, three of the six developing Canadian schools expect to have separate departments of behavioral science.

If the basic philosophy of any medical school is to be implemented, it must enjoy the top priority and commitment of all faculty. Any teaching unit or program expected to make a major contribution to the philosophy must be given the highest political, administrative, and academic support. Furthermore, it must give top priority to institutional goals over disciplinary goals. Anything less will result in an undermining of the philosophy and the establishment of competing and parochial goals. Such has been the fate of many new medical schools, established with the articulation of creative and innovative basic philosophies, but without the committed faculty or institutional commitments to accomplish the goal.

It has been claimed that the time to establish a new department is when the school is also new. Although there are certain advantages in being on a equal basis from the beginning, "growing up" with a new school is not as ideal a situation as our fantasies might portray. Problems, such as, academic credibility, colleague relationships, conjoint teaching, recruiting, and teaching program development are more difficult for a new discipline, regardless of the age of the particular institution. The philosophical priorities and commitment of resources are still the major determinants.

In terms of the academic ecology of most medical schools, it is important to recognize that the power structure still rests with the individual departments. This means that the decision making of curriculum hours, financial stability, policy matters, space, new programs and academic status still rests primarily with separate and collective departments. Without such an organizational base, even communication and integrative relationships with other departments and programs can become very difficult. Very often, claims are made that the departmental structure is archaic and that behavioral science should not perpetuate an archaic system. This may be true, however one must work within both the realities and the fantasies of the existing system in order to guarantee maximum survival and effectiveness. When the traditional departments reorganize into new and bold administrative formats, then behavioral science should do likewise.

Considering the student's perception of the academic ecology, the operating base of a separate department serves to provide visibility and credibility that the faculty is serious in its support of behavioral science and that the student can expect the behavioral sciences to be an equal partner in the academic survival system.

The developmental needs of the behavioral sciences and the behavioral scientists deserve special emphasis. The tasks of synthesizing a body of knowledge on basic human behavior, integrating this body of knowledge into medicine, and teaching in the context of medical problems requires the secure base of a separate department. Likewise, a research program can develop from within a department according to the needs and the interfaces found within the behavioral sciences, and will not be forced to conform to the interests and support of a host department.

Recruiting can also be accomplished more easily, since there is an intellectual excitement to be found in a new multidisciplinary department when one has the sense of establishing new academic frontiers. Medical schools have to compete with other university departments and disciplines for the career commitments of behavioral scientists. Separate departments are far more effective in attracting and holding those behavioral scientists. They quickly discover that the sensitive, stimulating, and supporting relationships they are able to develop with the medical students and their own colleagues are very rewarding. With these kinds of securities and rewards, medical behavioral scientists find less need to hang desperately to their original discipline identities on campus and will be free to make the maximum contribution in the medical setting.

This does not mean that all behavioral scientists in a medical school must be in such a department. Other disciplines in medicine will undoubtedly have some special needs which require the services or skills of a full-time behavioral scientist. This is very desirable, and having a separate department can often help other departments recruit and retain behavioral scientists, for example, through a joint appointment relationship.

Again, assuming that one has opted for a separate department, it is important to allow the new department to develop a structure and function that does not necessarily fit that of the traditional basic science department. An academic model closer to that of a modern pharmacology department might be more compatible with new teaching and patient care programs which are developing in medical education. To be more specific about the pharmacology departmental model, consider the disciplinary breadth whereby one might expect to find in one department, individuals who are clinical pharmacologists, perhaps as boarded internists, and on the other end of the continuum to find an individual working at the more molecular level who may be basically a biochemist. This allows for the development of multidisciplinary bridging and integration on both the clinical and basic science levels. Such a departmental model would contain both Ph.D.'s and M.D.'s and should have a much greater chance of impact and survival in the new curricula proposals being implemented throughout the country.

2. Division or Section of a Department.

A review of behavioral science teaching units in medical schools shows that the most common administrative structure for behavioral scientists is in a division of behavioral science, usually within a department of psychiatry.[3] Occasionally, such a division will be formed within a department of community medicine, internal medicine, pediatrics, or preventive medicine. For example, the behavioral science units at the University of Missouri and at Mt. Sinai are found within departments of community medicine; at the University of Connecticut it is found in the Department of Clinical Medicine and Health Care. At the University of Toronto, the Department of Behavioral Science was formerly a division in the Department of Pediatrics. At the University of Arizona there is an autonomous and separate Division of Social Perspectives in Medicine.

In many instances, the development of a division or section of behavioral science in a traditional department was the natural outgrowth of mutual interests and needs of the clinical discipline and the behavioral scientists. In psychiatry, there was a very natural sharing of common interests in human behavior. Since the traditional basic sciences did not do teaching or research directly related to the problems of clinical psychiatry, it was necessary for psychiatry to teach its own basic science and to do research on its own basic problems. They needed the basic science training and the research skills of the behavioral scientist.

As more and more behavioral scientists were recruited into departments of psychiatry, they became actively involved in the teaching and research programs of psychiatrists, but eventually began to demonstrate a collective strength in teaching the basic science of human behavior from the first year teaching program through the psychiatric residency program. They also began to secure their own research grants and support for studying human behavior problems, both psychiatric and non-psychiatric.

Thomas Webster has made the analogy of the behavioral scientist often feeling himself to be in the position of a foster child without some of the privileges of his medical faculty siblings. The host department chairman often found himself in the position of the foster parent and he became understandably bewildered when the person he had sponsored and supported developed feelings of ungratefulness for the fact that he was not treated like a real son and that he should eventually want a house and family of his own. This analogy is not far from the actual situation in many departments of psychiatry, especially when the teaching and research skills began to find expression in other traditional clinical and basic science departments of the medical school, and when the behavioral scientists began to see themselves as second class citizens.

One must recognize that the development of divisions of behavioral science in departments of psychiatry was a most important evolutionary step. It is unlikely that the discipline of behavioral science would have progressed as rapidly to the level where it could function as a separate departmental unit if it were not for this initial support, encouragement, and nurture.

On the other hand, the reactions of departments of psychiatry have proved to be highly variable. Some departments of psychiatry have helped to nourish and develop the behavioral sciences to the state of readiness for independent status as a separate discipline or department and have encouraged their contributions to other clinical departments and teaching programs. A few departments of psychiatry have responded by altering their department names to include behavioral science in the title; sometimes in an effort to give equal billing and status, and at other times, to capture and consume all contributions of the behavioral sciences. A few others have been so threatened by the behavioral sciences that they have rigidly resisted either the development, or the escape, of behavioral science.

In addition to providing a sympathetic and helpful haven during the initial stages in the growth and development of the behavioral sciences, a division can have the added advantage of allowing a critical mass of faculty to accumulate and a teaching program to be tested-out before administrative autonomy is acquired. Of course, other departments, such as community medicine, internal medicine and pediatrics can also serve this role equally well. If the transition to a separate or autonomous administrative unit is not anticipated, then the colleague relationships, the proportion of support, and the plans for both the nurture and the integration of the behavioral sciences in the curriculum needs special monitoring by the medical school administration. As is often the case in other academic endeavors, the success or failure of a division of behavioral science depends to a great extent on the mutual educational commitments and individual personalities of the people involved.

3. A Curriculum or Subject committee.

About one-fourth of all medical schools have adopted a complete or modified subject committee or systems committee approach, as pioneered by Case Western Reserve University. Usually an interdepartmental curriculum or subject committee operates independently of any departmental base. The teaching faculty may be drawn from several different basic science or clinical departments. Decisions of content and method are usually made by the different subject committees and an interdisciplinary format is emphasized.

Harvard University uses a curriculum committee for the administration of its social and behavioral science program, while Virginia Commonwealth University, the University of Connecticut, and the University of Alabama, are examples of the use of a subject committee administration.

In terms of the criterion of promoting the basic philosophy and goals of the school, a curriculum or subject committee administrative unit has certain advantages. The major benefit is that it takes the curriculum decision making and control away from the individual departments or disciplines and places it in an interdisciplinary group whose major responsibility is a learning program for the students. This allows the individual departments to continue to pursue their disciplinary goals, but not at the expense of the institutional goal of training the best possible physician.

The academic ecology of a curriculum or subject committee is mainly influenced by the shift of power and decision making mentioned above. It serves to structure interdisciplinary teaching arrangements which can result in interdisciplinary research efforts as well. Students respond more positively because they feel that the faculty are actually working together, rather than promoting their own disciplinary or departmental goals.

Problems occur when a special curriculum or subject committee is organized only for the purpose of presenting the behavioral sciences. While this can serve an initial positive function by providing a committee charged with the responsibility of formulating and emphasizing behavioral science content, unless the other parts of the curriculum are organized in a similar fashion it seriously reduces the credibility and impact of the behaviorel science teaching effort. The message often received is that behavioral science is important enough to have a special committee, but not really important enough to be put on an equal basis with other disciplines or departments.

Recruiting of behavioral scientists is also more difficult under this administrative arrangement, since they are being asked to operate without a common academic home base within the medical school. The problems of academic identity can be accentuated through such an organizational form unless careful planning and rewards are instituted.

Since behavioral factors are a part of most biological phenomena, a subject committee can help the behavioral sciences develop as a truly integrative discipline. However, this initial gain will be lost unless other disciplines in the school also use a similar format and take a major responsibility for the integration of their own subject matter.

4. Departments of Anthropology, Psychology, or Sociology.

Several medical schools have organized behavioral science teaching units by utilizing faculty from the disciplinary departments in the parent university, occasionally with joint appointments in a clinical or basic science department of the medical school. The best example of this effort is at Michigan State University where a number of the university basic science departments relate to the new college of human medicine while they remain as the administrative and disciplinary entities in their parent departments of the university. This is coordinated by an associate dean in the College of Human Medicine, who is also an associate dean in the College of Social Science. The College of Human Medicine provides a financial reimbursement for the cooperating teaching faculty from the disciplinary departments. The State University of New York at Stony Brook uses a similar administrative arrangement through a Division of Social Sciences and Humanities. Other medical schools, such as Stanford University and the University of Alberta, have also decentralized the behavioral science offerings to utilize the university departments as well as the medical school departments.

This organizational form can serve to promote the basic philosophy and goals of the medical school, especially when it is also the major administrative structure for the other basic sciences. It works less well when it is used as an administrative arrangement for behavioral science only. Through such an arrangement, the medical school is able to request, reimburse, and reinforce those teaching efforts which make the greatest contribution to the fulfillment of the basic philosophy and goals of the school.

In terms of the total academic ecology, this administrative arrangement places the power and the decision making responsibilities in the school of medicine. Furthermore, it emphasizes the responsibility of the clinical faculty to design and shape the curriculum experiences for the student physicians. Also, it will probably be more easily accomplished in a new school, rather than in an older school with established traditional basic science departments. The possibilities of developing and extending the integration of the medical school and the university can be greatly enhanced by this arrangement.

However, this decentralized academic arrangement will not serve the developmental needs of medical behavioral science as a discipline. Medical behavioral scientists will be united through their interdepartmental teaching assignments, but the tendency will be to retain a purer disciplinary orientation, since they will still lack a common base from which to work and affiliate with other medical disciplines.

Recruiting of behavioral scientists may be enhanced somewhat, because of the generic disciplinary identity, but the translation and bridging of the pure discipline into the medical sciences will be handicapped. In the past, the transplanting of a pure behavioral scientist into a medical school has not resulted in maximum effectiveness until after a considerable period of working and teaching by the behavioral scientist in a medical setting. This is an important reorientation and commitment which is often overlooked in the attempt to utilize the behavioral science resources of the university. The traditional academic rewards in a disciplinary department of the university do not generally place a high value on individuals who attempt to take their pure discipline and translate or apply it to a profession such as medicine. Therefore, such an administrative arrangement would require the recruitment and training of special individuals, with special commitments, special responsibilities, and with special rewards built into the system.

5. Renamed traditional department.

In this organizational arrangement, a traditional clinical or basic science department may change its name and mission to include a major behavioral science component. It is often similar to a division or section arrangement, except that the term behavioral science appears in the name of the department and there is often more autonomy allowed.

Examples of the above are: the University of Oklahoma with its Department of Neurology, Psychiatry, and Behavioral Science; the University of California at Irvine with a Department of Psychiatry and Human Behavior; Loma Linda University with a Department of Legal and Cultural Medicine; the Chicago Medical School, Johns Hopkins University, and Louisana State University with Departments of Psychiatry and Behavioral Science.

This does not necessarily provide more additional support for the basic philosophy and goals of the institution than any other administrative arrangement. When Behavioral Science has been added to a traditional department and the name changed to include behavioral science in the title, this at least provides visibility and recognition for the Behavioral Sciences. If a new department is organized combining two or more disciplines, it can often have more of an impact because of a new teaching unit being introduced into the traditional system, but with equality of status and support.

One of the major ecological factors includes a more egalitarian relationship with one's colleagues. This appears to work better than the section or division administrative structure, in that behavioral scientists may feel more autonomous and less as second class citizens in a medical school.

In terms of the developmental needs of the behavioral sciences, combining with a traditional department can provide many of the advantages of the separate department. The protection of the traditional department can allow the behavioral scientists to develop their staff, content, methods, research, and consultative relationships without having to assume all of the institutional responsibilities of a separate department. The professional identity crisis can also be alleviated by the autonomy and the protection provided.

There seems to be an expectation on the part of some medical educators that the administrative pattern for the future will be to combine basic science and clinical departments according to their disciplinary overlap and their supporting relationships. The argument is then made that the behavioral sciences should set the pattern for the future, rather than organizing along traditional departmental lines. This argument makes considerable sense, if the institution is already in the process of reorganizing its traditional departments. A new discipline struggling to establish its content, identity, and relationships in medical education should not have to suffer the additional trauma of spearheading a rational, but possibly impractical, innovation.

Also, the assumption is usually made that the best multidisciplinary combination would be with psychiatry. This should be more carefully examined, as in many schools the behavioral sciences are establishing a much more complementary and integrative relationship with such groups as community medicine, family medicine, and pediatrics.

If the behavioral sciences are truly basic to all areas of medicine, then it is extremely difficult to select one clinical specialty and insist that it integrate primarily with that specialty. There is no doubt that this would do a lot to develop the clinical specialty of psychiatry, but it might be at the expense of the desperate behavioral needs of the other specialties or general areas in medicine.

6. Institute or Center.

The development of centers or institutes within, or associated with, medical schools has served as a logical administrative home for several behavioral science teaching units. The center or institute is usually organized for the purpose of conducting research in close association with a medical school, teaching hospital, or a related university facility.

Examples of such centers are: The Behavioral Science Center at Bowman Gray, The Mental Health Research Institute at the University of Michigan, The Center for Neurobiological Sciences and a Human Development Center at the University of Florida, The Behavioral Sciences Study Center at Yale University, the Brain Research Institute at U.C.L.A., and The Neurosciences Program at the University of Alabama.

In general, most of the behavioral science units established within centers or institutes have not proved to be as effective teaching units as those established within medical school departments or subject committees. One of the major reasons is that, with a few exceptions (possibly Bowman Gray), most of the centers are established with the primary goal of research, rather than teaching, and they are most often peripheral, financially and academically, to the mainstream of the medical school and the university. That is not to say that they do not serve the institution in a productive manner, but that if one is attempting to organize a teaching program for student physicians or health care professionals, the commitment to teaching and medical education must be stronger than the commitment to research.

The considerations of academic ecology are still relevant for centers and institutes, since most are not directly involved with the decision making responsibility for the medical school curriculum. When a center is organized for the specific purpose of implementing and integrating a behavioral science teaching unit, it can experience a great deal of success. However, most behavioral science units in a center or institute were placed there because of some disciplinary similarity, for example with the neurological sciences, rather than to provide an environment for the development of an autonomous discipline of behavioral science. Occasionally, behavioral science is placed in an institute or center because everyone recognizes that it is very important, but no one knows exactly where to put it.

Because of his research skills and interests, the behavioral scientist can probably make a greater contribution to the mission of a center than the center can make to the mission of behavioral science teaching.

The academic ecology discussed above is particularly relevant when one considers the developmental needs of the behavioral sciences as an evolving discipline concerned with the teaching of medical students. The needs of a behavioral science research program can be greatly aided by the center or institute as an organizational structure, while the development of a teaching program, as discussed above, can be considerably handicapped unless the behavioral sciences are in the mainstream of curriculum planning and medical education.

Summary and Conclusions.

As has been illustrated, the selection of an optimal organizational form for a medical behavioral science program involves a multitude of factors. Some of the more important dimensions include the extent to which a particular organizational form will accomplish the basic philosophy and goals of the medical school, the practical politics of academia in terms of the total ecology in which the behavioral science unit must relate to colleagues and other disciplines in a student-oriented learning situation, and the extent to which the particular organizational form provides for the needs of the behavioral sciences as a developing discipline and the behavioral scientists as effective teachers of medical students.

Many other factors have been considered, such as: the multi-disciplinary character of such a unit; the need for both Ph.D. and M.D. behavioral scientists to continually bridge and integrate into relevant medical problem solving; the need to establish and integrate the behavioral sciences vertically during each of the four years of medical school; the need to recognize the personality and professional problems of identity, recruiting, rewards, colleague relationships, and basic commitments to medical students and medical education.

There is at least one important factor which has not been discussed. It has to do with a planned grace period between the formation of such a behavioral science teaching unit and the intradepartment and inter - departmental evaluation which may be applied to such a unit. Intradepartmental evaluation should be a continuing process from the beginning, but there should be at least a five year grace period before any external evaluation is attempted. This is to allow the behavioral scientists to explore, develop, test-out, and evaluate various means of interpreting, integrating, and applying the knowledge of basic human behavior to medical problem solving and patient care situations.

The new behavioral science administrative and teaching units developing around the United States and Canada are demonstrating a revitalization of medical education and of the relationship of behavior to disease and patient care. Rigid departmental and disciplinary lines are giving way to more integration and a reorientation of medical education toward better training for primary care responsibilities.

If our understanding of human health and disease is to progress, we must develop administrative and disciplinary structures which can change and grow along with our knowledge, skills, and priorities.

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